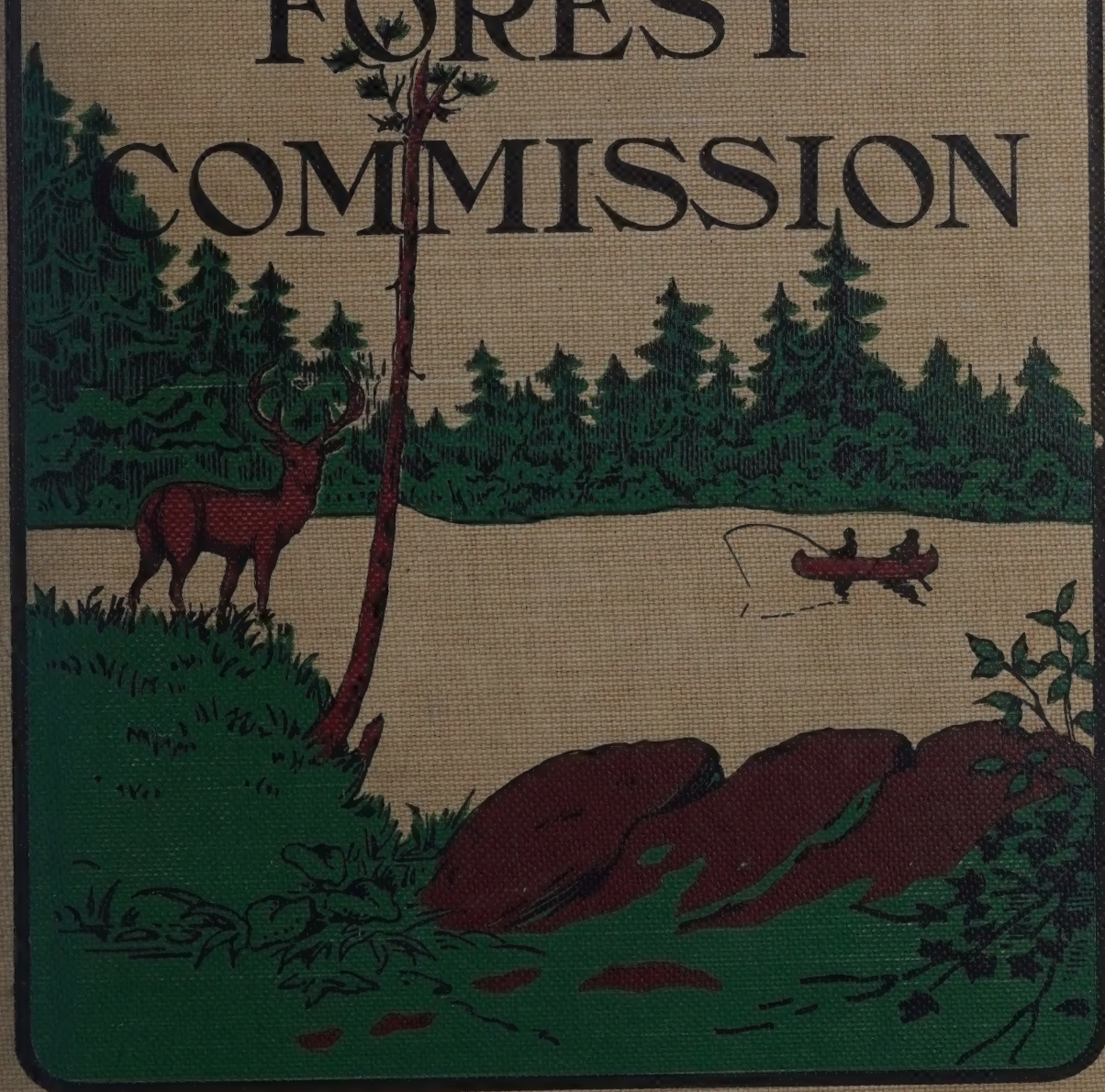
FISHERIES GAME AND FOREST COMMISSION



THE LIBRARY

UNIVERSITY OF MAINE
ORONO, MAINE

THE NEW YORK STATE LIBRARY

Fifth Annual Report

of the

Commissioners of Fisheries, Game and Forests

of the

State of New York.

NEW YORK STATE LIBRARY

JAMES B. LYON, STATE PRINTER,

ALBANY, NEW YORK.

1900.

Denton

THE CANADIAN RED TROUT

ADULT MALE

Fifth Annual Report

of the

Commissioners of Fisheries, Game and Forests.

Albany, N. Y., January 20, 1900.

Hon. Samuel F. Nixon,

Speaker of the Assembly, Albany, N. Y.:

Sir:—We have the honor to submit herewith, as required by law, the official Report of this Board for the year ending September 30, 1899.

We are, Sir,

Very truly yours,

Barnet H. Davis,
President,

William R. Weed,
Charles H. Babcock,
Edward Thompson,
Hendrick S. Holden,
Commissioners of Fisheries, Game and Forests.

26,160

THE PRINTING OF THIS ENTIRE BOOK, INCLUDING THE
COLORED ILLUSTRATIONS, HALFTONES AND
TEXT, WAS EXECUTED BY

JAMES B. LYON, STATE PRINTER.
ALBANY, NEW YORK.

Table of Contents.

	PAGE
PREFACE,	13
REPORT OF THE COMMISSIONERS,	15
FINANCIAL STATEMENT,	19
GENERAL MAINTENANCE ACCOUNT,	19
DETAILS OF FINANCIAL STATEMENT,	453
EXPENDITURES FROM SPECIAL APPROPRIATIONS,	20
SUMMARY OF RECEIPTS AND DISBURSEMENTS,	20
FINES AND PENALTIES ACCOUNT,	21
TRESPASS ON STATE LANDS,	32
RENTALS OF STATE LANDS,	35
RECEIPTS FROM SHELLFISH LEASES,	35
MISCELLANEOUS RECEIPTS,	36
NET LICENSE FEES SUMMARY,	36
SCHEDULE OF LICENSES ISSUED TO NET FISH,	37
REPORT OF THE SHELLFISH COMMISSIONER,	71
REPORT OF THE SUPERINTENDENT OF HATCHERIES,	73
DISTRIBUTION OF FISH FROM EACH HATCHERY,	77
SUMMARY OF FISH PLANTED,	80
REPORT OF THE CHIEF PROTECTOR,	83
SPECIAL REPORT OF AND SUGGESTIONS BY THE SUPERINTENDENT OF FORESTS,	87
REPORT OF THE SUPERINTENDENT OF FORESTS,	93
AS TO FOREST FIRES,	97
AS TO PARIS EXPOSITION EXHIBIT,	110
AS TO NEW CATSKILL MAP,	113
STATE RESERVATION ON THE ST. LAWRENCE,	115
SUGGESTIONS AND RECOMMENDATIONS,	117
WATERS STOCKED WITH FISH,	119
TOTAL SUMMARY AND VARIETIES OF FISH PLANTED,	186

PAGE

THE COMMERCIAL FISHERIES OF LAKE ERIE, LAKE ONTARIO AND THE NIAGARA AND ST. LAWRENCE RIVERS, - - - - - - - - - - - - 189
By John N. Cobb.

SHAD CULTURE IN THE HUDSON RIVER, - - - - - - - - - - - 241
By A. N. Cheney.

TROUT FRY AND TROUT FINGERLINGS, - - - - - - - - - - 249
By A. N. Cheney.

FISH REPRESENTED IN THE COLORED PLATES, - - - - - - - - - 259
By Sherman F. Denton.

FIVE WELL-KNOWN GAME BIRDS, - - - - - - - - - - - - 265
By Harry C. Oberholser.

BALANCED AQUARIA, - - - - - - - - - - - - - - - 275
By L. B. Spencer.

TIMBER PRODUCT OF THE ADIRONDACKS - - - - - - - - - - 279
By William F. Fox.

FOREST FIRES IN 1899, - - - - - - - - - - - - - - 305
By William F. Fox.

INSECTS INJURIOUS TO ELM TREES, - - - - - - - - - - - 351
By E. P. Felt.

SOME EUROPEAN FOREST SCENES, - - - - - - - - - - - - 381
By Dr. John Gifford.

FOREST TAXATION, - - - - - - - - - - - - - - - - 395
By C. A. Schenck.

BEGINNINGS OF PROFESSIONAL FORESTRY IN THE ADIRONDACKS, - - - - 401
By B. E. Fernow.

List of Illustrations.

		PAGE
The Canadian Red Trout — Adult,	*Facing*	2
The Canadian Red Trout — Young,	"	6
The Canvasback Duck,	"	12
The First Glimpse of the Enemy,		13
Ideal Sport,		15
Salmon — A Beauty,	"	18
The First Bird of the Season,	"	36
Trapping,	"	36
A Fine Game — Sea Bass,	"	70
The Bullhead,	"	72
Tiptilts for Pickerel,	"	82
The Dowitcher,	"	86
The Black-bellied Plover,	"	92
Paris Exposition — Forestry Exhibit,	"	110
A Miss,	"	116
Dipping Herring,		118
The White Perch,	"	118
A Clean Break,	"	154
Casting for Bluefish,	"	188
A Metropolitan Fisherman,		189
Cleaning and Drying Gill Nets,	"	192
Paying out the Gill Net,	"	192
Hauling in the Gill Net,	"	210
A Fishing Machine on the Niagara River,	"	210
Dog and Sled Used in Ice Fishing,	"	216
Baiting Set Lines,	"	234
The Large and Small Mouth Black Bass,	"	240
Got His Breakfast,		241
The Fishing Fleet off Shore,		247
The Striped Bass,	"	248
Making a Landing,		249

PAGE

SCENE AT A NEW YORK STATE HATCHERY, - - - - - - - - 253
THE BLUEFISH, - - - - - - - - - - - - - - - *Facing* 258
SHIPPING FISH TO MARKET, - - - - - - - - - - - - 259
HAULING LOBSTER POTS, - - - - - - - - - - - - 261
AT THE TRAPS, - - - - - - - - - - - - - - 264
THE SPANISH MACKEREL, - - - - - - - - - - - - " 264
A TILLER OF THE SOIL, - - - - - - - - - - - - 265
A BUSYBODY, - - - - - - - - - - - - - - 268
IN THE WHEAT FIELD, - - - - - - - - - - - - 270
THE GREATER YELLOW LEGS, - - - - - - - - - - - " 270
EARLY MORNING, - - - - - - - - - - - - - 274
THE AMERICAN GOLDEN PLOVER, - - - - - - - - - " 274
A BIT FROM A SALT WATER AQUARIUM, - - - - - - - - 275
FRESH WATER BALANCED AQUARIUM, - - - - - - - - " 276
DRYING THE NETS, - - - - - - - - - - - - - 278
IN THE FOREST, - - - - - - - - - - - - - 279
"PORK AND BEANS"—STATE FORESTERS' CAMP, - - - - - - - " 280
AN ADIRONDACK STREAM, - - - - - - - - - - - " 282
WHITE FACE MOUNTAIN RANGE, - - - - - - - - - - " 296
THE NARROWS—WILMINGTON NOTCH, - - - - - - - - " 298
WHERE THE AU SABLE SLEEPS, - - - - - - - - - - " 300
A BAD PLACE FOR THE LOG DRIVERS, - - - - - - - - " 302
A HUNTER'S DREAM, - - - - - - - - - - - - 305
"THE LOGS ARE COMING," - - - - - - - - - - - " 308
FIRE ON BLACK BEAR MOUNTAIN, - - - - - - - - - - " 322
A FIRE SLASH, - - - - - - - - - - - - - - " 328
FIGHTING FIRE, - - - - - - - - - - - - - - " 332
A SMOKY TIME, - - - - - - - - - - - - - - " 338
TRENCHING A FOREST FIRE, - - - - - - - - - - - - " 346
DENUDED BY FIRE, - - - - - - - - - - - - - 350
WORK OF THE ELM LEAF BEETLE, - - - - - - - - - - 356
WORK OF YOUNG CATERPILLAR, - - - - - - - - - - 360
OTHER INSECT PESTS, - - - - - - - - - - - - - 362, 368
ELM LEAF BEETLE AND BAG OR BASKET WORM, - - - - - - *Facing* 364
FALL WEB WORM AND SPINY ELM CATERPILLAR, - - - - - - - " 372

		PAGE
Injured Elms,		373
Elm Borers and Elm Bark Louse,	*Facing*	378
Fagot-Gatherers near Pisa,		381
Famous Forest and Forestry School, Italy,	"	382
Olive-Covered Hillside, Italy,	"	382
Old Olive Tree,	"	382
Harvesting Olives,	"	384
European Chestnut,	"	384
Chopping Wood for Charcoal, France,	"	384
Fagot-Gatherers with Cart,		385
Making Charcoal in France,	"	386
Sawing Beech Logs in France,	"	386
Chopping with Clumsy European Axe,	"	386
A Scene in Finland,		387
Sawing Boards by Hand, near Paris,	"	388
Fire Lane, Foot of Grand Dune, Gascony,	"	388
Oyster Parc, near Arcachon, France,	"	388
The Forestry School at Vallambrosa, Italy,		389
Reforesting a Deforested Mountain Top, France,	"	390
A Forest Scene in Germany,	"	390
The European Spruce,	"	390
A Clump of Trees in France Infested with Mistletoe,	"	392
German Spruce and Scotch Pine Forests, Bavaria,	"	392
The Forest of Compiegne, near Paris,	"	392
Tapping Trees for Resin in France,		393
The Monarch of the Forest,		395
An Adirondack Taxpayer,	"	396
In the Forest Preserve,	"	398
A Hazy Morning,		400
Logging Camp Office at Foresters,		401
Ready for the Freshet at Ampersand Creek,		406
Axton on the Raquette River,	"	412
Camp Foresters,		413
Student Measuring Trees,	"	420
Driving the Spruce to Market,	"	420

PAGE

CORNELL COLLEGE FOREST MAP, - - - - - - - - - - - - 422
NURSERY GROUND IN THE FOREST, - - - - - - - - - - *Facing* 424
LANE IN BIRCH AND ASPEN GROWTH, - - - - - - - - - - " 430
IMPROVEMENT CUTTING BY STUDENTS, - - - - - - - - - " 430
TIE-MAKING, - - - - - - - - - - - - - - - - - 431
THREE YEAR OLD NORWAY SPRUCE, - - - - - - - - - - " 436
PLANTING ON WASTE LANDS, - - - - - - - - - - - - " 436
THE WINTER'S HARVEST, - - - - - - - - - - - - - 437
PLANTING BURNT LAND, - - - - - - - - - - - - - " 440
STOVE WOOD CUT FROM BURNT TREES, - - - - - - - - - " 444
THE HUNTER'S PRIDE, - - - - - - - - - - - - - - 445
THE END OF THE JOURNEY, - - - - - - - - - - - - - 452

PREFACE.

THE FIRST GLIMPSE OF THE ENEMY.

WITH the completion of the Fifth Annual Report, the present Commission finishes its work and transfers its duties to others. Though somewhat delayed, for reasons similar to those recounted in the former volume, the Commission feels that this report, from the nature of the subjects presented, will fully compensate for the period of waiting. Attention is called to the rich and varied table of contents which, besides recording the official work of the Board in detail, provides, in the reports of the heads of the several departments, information relating to the public domain in the Adirondacks which is nowhere else obtainable. The great value of the lumber product of this forest is especially shown, and the danger arising from forest fires fully exploited. The financial statement shows to what advantage each appropriation was expended, and the concluding recommendations and suggestions indicate what, in the opinion of the Commission, ought to be done in the future.

In connection with those sections dealing with the great number and variety of fish raised and distributed in the waters of the State, attention is called to the very valuable article on the Commercial Fisheries of the Great Lakes and Rivers, which was specially prepared by Mr. John N. Cobb, of the United States Fish Commission. While the figures given with reference to the distribution of fish speak for themselves, the extent and value of the work that is being done by the Commission

in this line is fully demonstrated by the carefully prepared statements of the article to which reference has just been made. Attention also is called to the colored plates which abound in this volume. As in previous years, those of the fish have been prepared by Mr. Denton and those of the birds by Mr. Ridgway.

Besides the special articles already mentioned, the Commission acknowledges its indebtedness to Mr. Spencer, of the New York Aquarium; to Professor Felt, the State Entomologist; to Dr. Gifford, of Cornell University; to Dr. Schenck, the Forester of the Biltmore Estate; to Mr. Oberholser, and to Dr. Fernow, Director of the State College of Forestry at Cornell University, for the several valuable contributions to which their names are respectively attached. The growing interest in the Commission's task of working out the forestry problem in this State has led to the selection of the several exhaustive articles bearing on the subject which appear in this volume. Especial interest attaches to the contribution on the Beginnings of Professional Forestry in the Adirondacks, which recounts the preliminary work now being done by Cornell University in the Great North Woods. Dr. Gifford's description of European Forest Scenes is valuable as a companion study, and Dr. Schenck's views on Forest Taxation deal with a part of the problem which must sooner or later be considered. Professor Felt's contribution on Insects Injurious to Elm Trees deals directly with a subject of interest to many citizens, and its value has been shown by a demand for its publication in pamphlet form for general distribution.

THE COMMISSIONERS.

REPORT

of the

Commissioners of Fisheries, Game and Forests.

To the Honorable the Legislature of the State of New York:

IDEAL SPORT.

IN accordance with section 8 of chapter 395 of the Laws of 1895, we have the honor to submit herewith a report of the official operations of this department for the fiscal year ended September 30, 1899.

The following rules and regulations, which were adopted by the Commission May 29, 1895, have been observed in the transaction of the business of the department during the year:

1. Regular meetings of the Board shall be held on the second Tuesday of January, April, July and October, at the office of the Commission, in Albany, and at such other times and places as the same may be called.

2. Special meetings of the Board may be called at any time by the president, or, in case of his disability, by the Executive Committee, or upon the written request of any three Commissioners. Written notice of all special meetings must be given at least 24 hours previous thereto.

3. A majority of the Board shall constitute a quorum for the transaction of business, and all questions shall be determined by a majority of those present, a quorum voting.

4. The presiding officer and all other members present shall vote upon all questions unless excused by the Board.

5. The presiding officer shall determine all questions of order; and, in case of an appeal, a majority present may overrule his decision.

6. The president shall preside at all meetings when present. In the absence of the president, the Board shall elect one of their number to preside.

7. The order of business of the Board shall be:

(1) Roll-call.
(2) Reading and correction of minutes of last meeting.
(3) Report of Shellfish Commissioner.
(4) Report of State Fish Culturist.
(5) Report of Engineer (Superintendent of Forests).
(6) Report of Chief Protector.
(7) Secretary's report.
(8) Report of Auditing and Pay Clerk.
(9) Report of Standing Committees.
(10) Reports of Special Committees.
(11) Miscellaneous and unfinished business.

8. The following standing committees of three each, of which the president shall be one, shall be appointed by the president:

Committee on Forest Preserve and State Lands.
Committee on Hatcheries, Fish Culture and Game.
Committee on Licenses and Permits and Shellfishery.
Executive Committee.
Committee on Legislation.

9. It shall be the duty of the Committee on Forest Preservation and State Lands to consider and report upon all matters of land purchase and business incidental thereto, including the examination of offers which may be submitted, questions of land value, the extent and nature of timber-thieving and measures which should be adopted to suppress it; also, to consider and suggest plans for the better organization of the Firewarden system, and other matter arising out of the business connected with the forest and State lands in the care and custody of the Commission.

10. It shall be the duty of the Committee on Hatcheries, Fish Culture and Game to have charge of all matters pertaining to the hatching, culture and distribution of

fish; repairs and improvements to hatcheries; also, to look after the business and interests of the Commission in reference to the protection and preservation of fish and game.

11. The Committee on Licenses, Permits and Shellfish shall formulate and submit the rules for licensing net-fishing, as provided by law, and also for granting permits; and shall from time to time examine all licenses and permits granted, and ascertain whether the terms and conditions of the same have been abused or violated. They shall also have general charge of matters pertaining to the shellfish department not specially delegated to the Shellfish Commissioner by law.

12. The Executive Committee shall examine and audit all accounts, bills and pay rolls and indorse the same with their approval, when passed; and no bills or accounts shall be paid until so approved; examine and check all books and accounts; examine and check all regular and special reports of employes as often as once in each month and report the result of such examination to the Commission at its first meeting thereafter. They shall also have a general supervision of the business of the Commission and care and control of its interests when the Board is not in session.

13. The Committee on Legislation shall look after the necessary legislation of the Commission; shall examine and consider all proposed amendments or changes in the fish, game and forestry laws or new laws affecting these interests, and shall submit to this Board their opinion upon matters which, in their judgment, require legislative action.

14. The foregoing rules may be altered or amended by vote of a majority of the Commission, upon 10 days' notice being given, which notice may be in open meeting and entered on the minutes or by serving written notice.

Standing Committees.

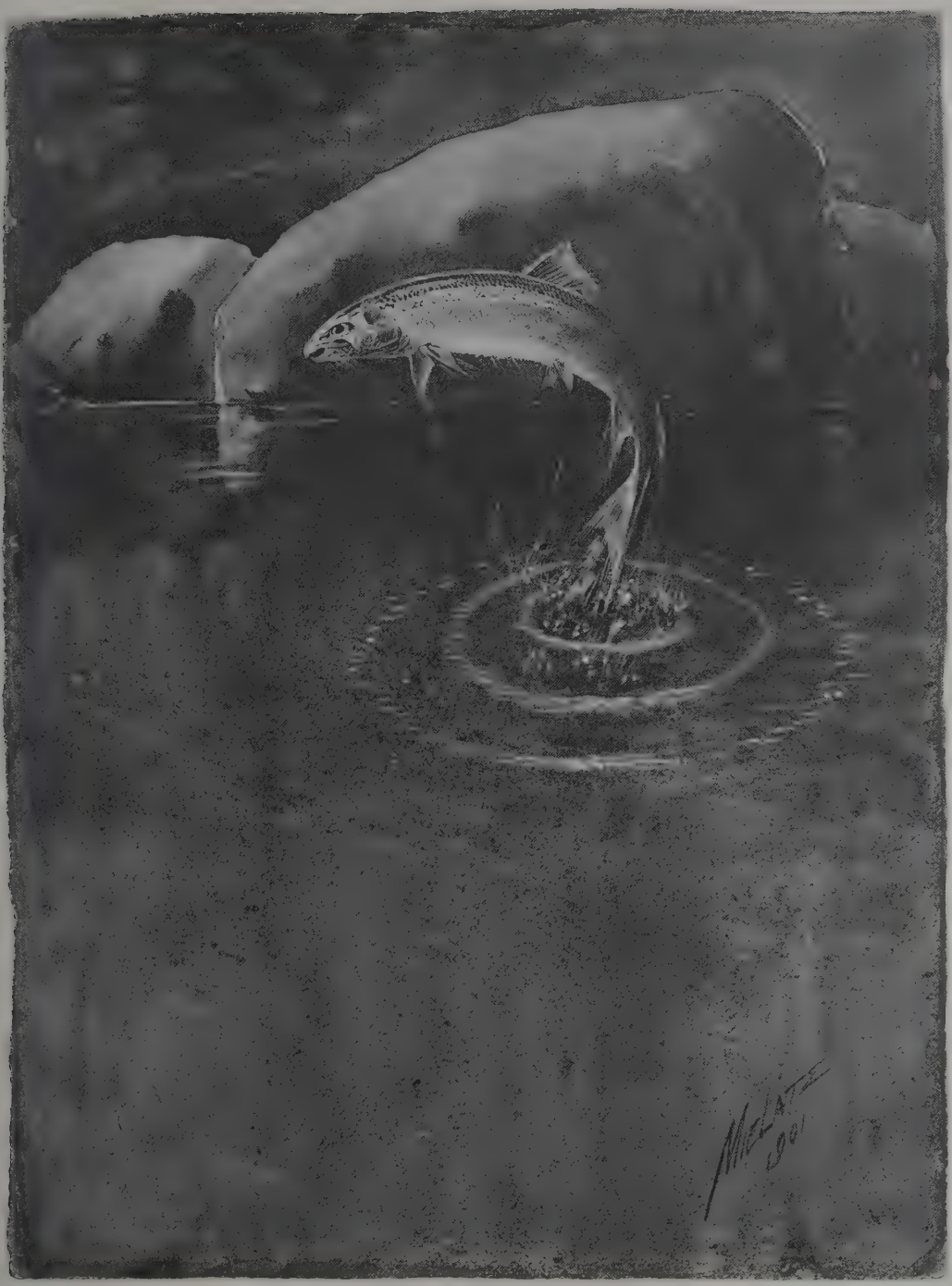
Forest Preserve and State Lands.— William R. Weed, Hendrick S. Holden, Barnet H. Davis.

Executive.— Hendrick S. Holden, Charles H. Babcock, Barnet H. Davis.

Hatcheries, Fish Culture and Game.— Charles H. Babcock, Edward Thompson, Barnet H. Davis.

Legislation.— Barnet H. Davis, William R. Weed, Charles H. Babcock.

The following is a summary of the financial transactions of the Commission for the fiscal year:



SALMON — A BEAUTY.

Financial Statement

For the Fiscal Year Ending September 30, 1899.

GENERAL MAINTENANCE ACCOUNT.

RECEIPTS.

Balance October 1, 1898,		$37,849 25	
Appropriation Chapter 593, Laws of 1898:			
For maintenance of hatcheries and hatching stations, collection and distribution of fish and fry,		54,000 00	
Salaries and expenses of Fish and Game Protectors and Foresters,		35,650 00	
Salaries and expenses of Commissioners and Officials,		24,000 00	
Clerical Force,		6,000 00	
Office expenses,		3,750 00	
Maintenance of Shellfish Department,		9,250 00	
			$170,499 25

EXPENDITURES.

For maintenance of hatcheries and hatching stations and the collection and distribution of fry,	Schedule A	$55,369 84	
For Fish and Game Protectors and Foresters' salaries and expenses,	" B	37,996 68	
For salaries and expenses of Officials,	" C	24,145 17	
For Clerical Force,	" D	7,378 18	
For stationery, printing and office expenses,	" E	3,736 50	
For Oyster Protectors and Shellfish Department,	" F	9,048 82	
			$137,675 19
Lapsed to Treasury,			211 91
Balance September 30, 1899			32,612 15
			$170,499 25

Summary of Expenditures from Special Appropriations During the Fiscal Year Ended September 30, 1899.

State Reservation on the St. Lawrence river,	Schedule G,		$14,904 91
Forest Preserve Fund,	"	H,	704 08
New York State Fair Exhibit,	"	I,	458 22
Examination titles, etc., Ulster county lands,	"	J,	375 00
Cayuga lake lamprey weirs and traps,	"	K,	130 50
Additional land for hatcheries,	"	L,	360 05
Rebates to towns on account of Firewarden claims,	"	M,	3,076 30
Extermination of billfish, Chautauqua lake,	"	N,	119 73
Construction of hatchery at Inland lake,	"	O,	250 10
Propagation of game birds,	"	P,	381 10
Accounts of moieties, costs of court, constable and attorney's fees,*			2,656 03
Cantwell & Cantwell, attorneys, costs in People v. Turner,	Schedule Q,		5,477 02
			$28,893 04

(See Appendix.)

Summary of Receipts and Disbursements on Various Accounts, Exclusive of Regular Accounts with the Comptroller:

Fines and Penalties Account.

Balance October 1, 1898,	$3,494 68
Receipts to September 30, 1899,	4,824 50
Receipts from net licenses added,	1,698 00
	$10,017 18
Disbursements, as per schedule,	$4,874 17
Balance State Bank, Albany,	4,694 77
Balance State Treasury,	448 24
	$10,017 18

Trespass on State Lands Account.

Balance October 1, 1898,	$1,187 06
Receipts to September 30, 1899,	3,323 97
	$4,511 03

*Included in Fines and Penalties Account.

Disbursements, as per schedule,	$3,199 91
Balance State Bank,	1,174 56
Balance State Treasury,	136 56
	$4,511 03

NET LICENSE RECEIPTS.

Balance October 1, 1898,	$840 00
Receipts to September 30, 1899,	1,238 00
	$2,078 00
Paid into Fines and Penalties Fund,	$1,698 00
Paid State Treasury,	380 00
	$2,078 00

MISCELLANEOUS RECEIPTS.

Rental of State lands,	$60 00
Shellfish franchises,	1,716 62
Sales of whitefish,	79 40
Hotel rebate, J. Annin, Jr.,	7 25
Sales of bullheads,	40 18
	$1,903 45
Paid into State Treasury,	$1,863 27
Balance State Bank to credit of Commission,	40 18
	$1,903 45

FINES AND PENALTIES ACCOUNT.

Receipts.

1898.			
Oct.	Charles Recor,	$36 15	
	A. A. Webster,	15 00	
	Walter H. Lent,	25 00	
	Clarence House,	10 00	
	Thomas Galloway et al.,	3 36	
	David Stone,	9 90	
	Harvey L. Jones,	45 70	
	Frederick Josh,	10 00	
	Charles Dart,	15 00	
	Geo. W. Hulse,	35 55	
	Marcus Dunsmore,	75 00	
			280 66
Nov.	Spencer Lockwood,	2 50	
	M. Rondimane,	17 50	
	Benj. Jones,	25 00	
	Forward,	$45 00	$280 66

1898.		Brought forward,	$45 00	$280 66
Nov.	Solon LeValley,		50 00	
	Geo. Snyder,		10 15	
	Frederick Apple,		7 50	
	Samuel Winans et al.,		50 00	
	Jas. W. Petrie,		47 90	
	Jas. H. Mandigo,		47 90	
	J. T. Avery et al.,		40 00	
	E. Roberts et al.,		49 50	
	Geo. M. Albott,		25 00	
	Anthony Koegel,		40 00	
	Chas. N. Perrin et al.,		11 72	
	Lester Shutts,		5 00	
	W. S. Wells,		10 00	
	Anzions Saluatore,		25 00	
				464 67
Dec.	John P. Drum,		$25 00	
	Chas. Terry,		7 50	
	Carlton Towne,		25 00	
	John W. Wright and Geo. Wilson,		14 85	
	D. P. and Chas. Wadsworth,		29 50	
	John Penny and C. Schwan,		10 00	
	Arnold Scripter,		25 00	
	Peter Luzza,		7 50	
	Frank Gorode,		7 50	
	Frank Greene,		10 00	
	Julius Nicholi,		10 00	
	Henry Wyant,		10 00	
	Frank Dari,		7 50	
	Edward C. Cranston,		10 50	
	Lewis Hueber,		150 00	
	Eldred & Haley,		25 00	
	Hayden H. Brown,		40 55	
				415 40
1899.				
Jan.	Chas. A. Gokey,		$18 00	
	Bert A. Petrie,		48 00	
	Ellsworth Hayes,		50 00	
	Forest Brinkerhoff,		37 50	
	Gordon Bouck,		35 00	
	E. Franchy,		7 00	
	Patrick Kleig,		7 00	
	Frank Desmond,		25 00	
	Reuben Loomis,		2 50	
		Forward,	$230 00	$1,160 73

1899.			
	Brought forward,	$230 00	$1,160 73
Jan.	H. J. Russell,	80 00	
	John Cresser, Jr.,	30 00	
			340 00
Feb.	Ebenezer Towner,	11 00	
	A. & C. Drum and C. J. Shafer,	13 90	
	John H. Saulisbury,	30 00	
	Chas. Grisner et al.,	37 50	
	Emil Bush,	75 00	
	John Rollman,	18 75	
	W. A. Konrad,	26 25	
	Bloch Brothers,	26 25	
	A. Richenburg,	7 50	
	Philip Ott,	7 50	
	G. Deninger,	18 75	
	Geo. W. Holmes,	3 75	
	Seneca Brown et al.,	65	
	C. L. Riker et al.,	52 40	
	Edward Inglesby,	35 00	
	J. H. Higby,	50 00	
			414 20
Mch.	Philip Lotz et al.,	29 97	
	Ferdinand Schlagate,	25 20	
	Asa Perry,	41 40	
	Frank L. Forgham,	11 75	
	Brucker, Truax et al.,	30 00	
	L. R. Needham,	40 00	
	N. Palmer,	25 00	
			203 32
April	Fred. Hill,	24 00	
	Albert Thomas,	30 00	
	Sidney Perkins,	47 45	
	Jas. Minkler et al.,	20 00	
	Geo. Stocking,	22 55	
	Orrin Duphney,	32 10	
	S. M. Wells,	9 00	
	Geo. W. Cole,	10 00	
	Ralph Cowen,	75 00	
	Jas. Sheehan,	41 15	
	Joseph Freund,	7 50	
	Ives & Russell,	7 50	
			326 25
May	Chas. E. Clothier,	22 90	
	Aaron Mathews,	5 55	
	Edward Buddle,	24 00	
	Forward,	$52 45	$2,444 50

1899.				
	Brought forward,	$52 45	$2,444 50	
May	Ernest Leonard et al.,	30 00		
	L. M. Benjamin,	15 00		
	Wm. Hurrell et al.,	45 00		
	Geo. Defoe,	8 25		
	Geo. Darling,	25 00		
	Frank L. Davis,	50 00		
	Michael O'Connor et al.,	75		
			226 45	
June	Larry Moylan,	2 15		
	W. Bradley and B. Turner,	25 00		
	Wm. Steinburg,	18 75		
	Wm. Mouff,	72 93		
	M. Geer and P. Craft,	25 00		
	Chas. A. Sullivan,	10 00		
	C. W. Anderson and another,	15 05		
	Edward O'Hara,	78 65		
	Frank Balt,	10 00		
	Philip Ploss,	25 00		
	Wm. J. Martin,	10 00		
	Chas. Belden et al.,	50 00		
	Lewis Hermans et al.,	61 00		
	Thos. Geer and B. Fenton,	30 00		
	Homer Hood,	20 00		
	George Mattice,	20 00		
	Chas. Potter,	10 00		
	Teddy Dolen,	10 00		
	Chas. Riley,	23 35		
	Perry Krull,	10 00		
	Emerson Van Court,	50 00		
			576 88	
July	Louis Cassango,	72 87		
	Russell Harris,	100 00		
	F. W. Coxon,	9 25		
	Henry W. Traver,	9 00		
	Chas. Allen et al.,	26 00		
	Luther W. Hawver,	2 50		
	Jno. Harrison,	22 50		
	Byron Watson,	26 25		
	Hugh McDavitt,	10 80		
	W. C. Delair,	25 00		
	Harry E. Smith,	13 10		
	Joseph Baggio et al.,	20 00		
			337 27	
	Forward,		$3,585 10	

1899.		Brought forward,		$3,585 10
Aug.	Samuel Bartlett,		$32 10	
	Elmer Wilde,		20 00	
	Chas. F. Kitteredge,		48 25	
	Frank C. Ives,		470 00	
	C. Woodworth,		13 00	
	John Hill,		23 00	
	George Murton,		8 00	
	Lewis I. Ingersoll,		10 00	
	John Borst et al.,		60 00	
	Arza R. Turner,		16 70	
	Chas. Abraham,		75 00	
	J. E. Henry,		50 00	
	Robt. McFarland et al.,		20 00	
	David Satterlee,		20 00	
	Jay D. V. Wellman,		4 35	
	Leander S. Case,		31 13	
				901 53
Sept.	Frank Osborn,		$15 00	
	Fred Sauer,		30 03	
	Omar D. Fellows,		10 00	
"	Adell and Isidore Pate,		39 46	
	Chas. Smith,		11 80	
	Stone, Clary & Butler,		50 00	
	Smith, Smith & Van Norden,		1 05	
	William Simons,		75 00	
	Wm. Miller,		24 00	
	Jotham Gay,		25 00	
	Geo. Beames and Jno. Warfield,		48 00	
	Wm. and Chas. Tousley,		8 53	
				337 87
	Total receipts,			$4,824 50

Fines and Penalties Account.

Disbursements.

1898.				
Oct.	Milton Carter,	court costs	$96 26	
	Saml. Pearsall,	moiety	18 07	
	E. J. Lobdell,	"	7 50	
	Hugh C. Smith,	"	12 50	
	E. A. Hazen,	"	5 00	
	John B. Rogers,	"	1 68	
	E. J. Brooks,	"	4 95	
	Moses S. Capen,	"	22 85	
		Forward,	$168 81	

1898.					
		Brought forward,	$168 81		
Oct.	E. J. Brooks,	moiety	3 90		
	E. A. Hazen,	"	6 00		
	John Ferguson,	"	17 77		
	Bentley S. Morrill,	"	32 50		
	J. M. Maybee,	attorney's fees	30 00		
	Ackerly & Miles,	" "	25 00		
	C. S. Dwinells,	" "	5 00		
				$288 98	
Nov.	Stephen Clark,	moiety	$1 25		
	T. H. Donnelly,	"	11 50		
	D. H. McKinnon,	"	25 00		
	E. I. Brooks,	"	5 07		
	Perley C. Perry,	"	3 75		
	T. H. Donnelly,	"	25 00		
	E. A. Hazen,	"	47 90		
	E. J. Lobdell,	"	20 00		
	E. J. Lobdell,	"	24 75		
	E. J. Lobdell,	"	12 50		
	Wm. Everson,	"	12 12		
	T. H. Donnelly,	"	3 36		
	Chas. R. Coville,	attorney's fees	52 80		
	Chas. L. Hubbell,	" "	15 00		
	Robt. S. Jones,	disbursements	17 78		
	D. C. Walker,	meals for witnesses	7 50		
	Geo. W. Harmony,	disbursements	18 32		
	Philip Keck,	attorney's fees	15 00		
	Earl Bancroft,	" "	8 00		
	Robt. Clark,	constable's fees	3 05		
	Ernest G. Gould,	attorney's fees	10 00		
	Jas. Gallagher,	" "	53 35		
	Sammis & Bierck,	" "	42 50		
	J. C. Toole,	" "	60 00		
	J. C. Toole,	" "	25 00		
	Jas. L. Sackett,	justice's fees	14 00		
	Jas. L. Sackett,	" "	12 35		
	Jas. L. Sackett,	" "	13 65		
	Jas. L. Sackett,	" "	6 15		
	Geo. W. Van Buren,	moiety	7 50		
				574 15	
Dec	L. L. Jennings,	constable's fees	$5 80		
	John E. Leavitt,	moiety	12 50		
	John Hunkins,	"	12 50		
	W. L. Reed,	"	7 42		
		Forward,	$38 22	$863 13	

1898.		Brought forward,	$38 22	$863 13
Dec.	E. J. Lobdell,	moiety	14 75	
	Hugh C. Smith,	"	5 00	
	Alvin Winslow,	"	12 50	
	F. M. Potter,	"	5 25	
	William Everson,	"	75 00	
	John C. Marchant,	"	12 12	
	Hiram Hall,	constable's fees	13 90	
	Joseph Canepi, Jr.,	detective work	46 99	
	G. W. Cole,	attorney's fees	80 79	
	B. H. McCollum,	court costs	13 75	
	W. S. Leonard,	constable's fees	2 50	
	J. W. Lock,	" "	2 35	
	Irvin F. Reese,	justice's fees	2 65	
	James E. Herbert,	constable's fees	2 50	
	Wm. H. Ronerdink,	justice's fees	4 55	
	Ernest G. Gould,	attorney's fees	10 00	
	Wm. L. Pattison,	" "	10 00	
	J. W. Pond,	advanced for expenses	100 00	
	A. N. Clark,	moiety	20 27	
				473 09
1899.				
Jan.	E. A. Hazen,	moiety	$9 00	
	E. A. Hazen,	"	24 00	
	F. S. Beede,	"	25 00	
	H. L. Wait,	"	18 75	
	B. H. McCollum,	"	17 50	
	J. F. Shedden,	"	3 50	
	J. F. Shedden,	"	3 50	
	Geo. Carver,	"	12 50	
	M. C. Worts,	"	19 50	
	F. S. Beede,	"	12 00	
	J. Harvey Winslow,	justice's fees	8 80	
	John P. Kellas,	judgment for costs	28 34	
	L. P. Hale,	attorney's fees	41 00	
	Walter S. McGregor,	" "	10 00	
	William Nearey,	" "	40 00	
	C. V. Fullington,	justice's fees	9 30	
				282 69
Feb.	Denis P. Wood,	moiety	$5 50	
	Denis P. Wood,	"	6 95	
	Edgar Hicks,	"	5 00	
	M. M. Jackson,	"	5 00	
	Spencer Hawn,	"	15 00	
		Forward,	$37 45	$1,618 91

1899.				
		Brought forward,	$37 45	$1,618 91
Feb.	Charles F. Cantine,	attorney's fees	72 00	
	L. S. Emmons,	disbursements	10 00	
	Louis E. Desbecker,	attorney's fees	85 00	
	A. A. Wyckoff,	moiety	18 75	
	Edgar Hicks,	"	91 87	
	Willett Kidd,	"	32	
	James Holmes,	"	26 20	
	T. H. Donnelly,	"	17 50	
	Robert S. Pelletreau,	attorney's fees	24 65	
	Marvin Hillebrant,	constable's fees	9 25	
	Walter H. Jaycox,	attorney's fees	10 00	
	Robt. S. Jones,	disbursements	60 83	
	Willis Gleason,	justice's fees	14 25	
	Edward B. Mowbray,	attorney's fees	40 00	
	M. J. Bruton,	constable's fees	9 55	
	E. J. Ames,	" "	11 26	
	M. J. Bruton,	" "	12 75	
	E. J. Ames,	" "	27 90	
	Edwin W. Parsons,	stenographic work	5 00	
	M. J. Bruton,	constable's fees	4 50	
	E. J. Ames,	" "	4 50	
				593 53
Mch.	Edgar Hicks,	moiety	$14 98	
	E. I. Brooks,	"	12 60	
	M. C. Worts,	"	20 70	
	E. I. Brooks,	"	5 87	
	George Carver,	disbursements	2 25	
	W. E. McCollum,	attorney's fees	42 47	
	F. H. McOmber,	justice's fees	13 05	
	Henry L. Gates,	attorney	15 00	
	Warren Bishop,	constable's fees	30 00	
	Luther S. Lake,	disbursements	4 72	
	Barnabas Newby,	constable's fees	45	
	Sammis & Bierck,	attorney's fees	28 75	
	E. M. White,	moiety	12 50	
	Willett Kidd,	disbursements	7 80	
				211 14
April	L. S. Emmons,	moiety	$12 00	
	Joseph Northrup,	"	15 00	
	W. L. Reed,	"	23 72	
	Chas. Van Steenburgh,	"	10 00	
	T. H. Donnelly,	"	11 27	
	W. J. Alfred,	"	16 05	
		Forward,	$88 04	$2,423 58

1899.				
		Brought forward,	$88 04	$2,423 58
April	James Holmes,	moiety	4 50	
	H. L. Wait,	"	20 00	
	Charles Van Steenburgh,	"	5 00	
	Spencer Hown,	"	29 60	
	W. W. Hildredth,	"	20 57	
	Edgar Hicks,	"	3 75	
	John E. Leavitt,	disbursements	14 50	
	Daniel Warren,	justice's fees	10 60	
	Robt. F. Thompson,	attorney's fees	10 00	
	Duncan D. Cameron,	justice's fees	4 25	
	Roy A. Peck,	stenographic work	1 50	
	Arthur M. Payne,	justice's fees	2 90	
	Union Building Association,	use of hall for court	3 00	
				218 21
May	Wm. H. Crane,	attorney's fees	$14 85	
	J. W. Pond,	boat hire	250 00	
	Alvin Winslow,	moiety	11 45	
	Dennis P. Wood,	"	2 77	
	L. S. Emmons,	"	12 00	
	William Everson,	"	15 00	
	L. S. Emmons,	"	7 50	
	L. S. Emmons,	"	22 50	
	J. F. Shedden,	"	4 12	
	John E. Leavitt,	"	12 50	
	L. S. Emmons,	witness' fees	10 00	
	Chas. W. Faulkner,	constable's fees	1 50	
	W. H. Crane,	attorney's fees	65 66	
	Willett Kidd,	moiety	37	
				430 22
June	Thos. J. Comstock,	"	$1 07	
	T. H. Donnelly,	"	12 50	
	Edgar Hicks,	"	9 37	
	Edgar Hicks,	"	36 46	
	L. S. Emmons,	"	12 50	
	Chas. Vogelsang,	"	5 00	
	Carlos Hutchins,	"	7 52	
	James H. Lamphere,	"	39 32	
	M. C. Worts,	"	5 00	
	Willett Kidd,	"	12 50	
	L. S. Emmons,	"	5 00	
	Alvin Winslow,	"	25 00	
	Geo. B. Smith,	"	30 50	
	L. S. Emmons,	"	15 00	
		Forward,	$216 74	$3,072 01

1899.				
	Brought forward,		$216 74	$3,072 01
June	L. S. Emmons,	moiety	10 00	
	D. H. McKinnon,	"	10 00	
	M. C. Worts,	"	5 00	
	M. C. Worts,	"	5 00	
	T. H. Donnelly,	"	11 67	
	Eugene P. Young,	constable's fees	2 95	
	O. B. Arnold,	justice's fees	6 40	
	Geo. H. Weyant,	" "	3 50	
	Geo. H. Weyant,	" "	18 55	
	Udelle Bartlett,	attorney's fees	23 74	
	Dewitt Staring,	constable's fees	3 60	
	Duncan D. Cameron,	justice's fees	3 00	
	Elmer Gilbert,	" "	3 85	
	Elmer Gilbert,	" "	2 35	
	Ira B. Payne,	constable's fees	7 15	
	D. O. McRostie,	justice's fees	6 00	
	T. H. Donnelly,	moiety	5 00	
	Josiah H. Marshall,	justice's fees	2 60	
	Josiah H. Marshall,	" "	4 30	
	L. S. Emmons,	moiety	25 00	
				376 40
July	Edgar Hicks,	"	$36 43	
	B. H. McCollum,	"	50 00	
	T. H. Donnelly,	"	4 62	
	Wm. Everson,	"	13 00	
	Wm. Everson,	"	11 25	
	J. F. Olive,	"	5 40	
	E. A. Hazen,	"	12 50	
	T. H. Donnelly,	"	6 55	
	Willett Kidd,	"	10 00	
	L. B. Storke,	justice's fees	9 85	
	Edward H. Foster,	" "	7 55	
	R. H. McIntyre,	" "	15 55	
	W. E. Sumner,	" "	4 35	
	J. C. Bardo,	" "	10 80	
	Elijah Thurston,	constable's fees	2 40	
	Alfred McJury,	" "	6 95	
	Wm. E. McCollum,	" "	6 40	
	Wm. E. McCollum,	assistant to protector	41 50	
	Fred. H. Baker,	attorney's fees	25 00	
	W. H. Hilts,	" "	30 00	
	Oliver Fanning,	constable	11 75	
	J. H. Lapan,	constable's fees	9 75	
		Forward,	$331 60	$3,448 41

1899.				
		Brought forward,	$331 60	$3,448 41
July	Monroe Wheeler,	attorney's fees	57 00	
	H. P. Coats,	" "	15 00	
	M. A. Martin,	" "	32 50	
	Jas. A. La Seur,	" "	10 00	
Aug.	A. N. Clark,	moiety	16 05	
	Wm. H. Burnett,	"	8 22	
	F. S. Beede,	"	24 12	
	J. W. Pond,	"	37 56	
	E. A. Hazen,	"	6 50	
	E. A. Hazen,	"	11 50	
	E. A. Hazen,	"	4 00	
	Jas. Holmes,	"	5 00	
	Alvin Winslow,	"	30 00	
	Jas. F. Shedden,	"	8 35	
	B. H. McCollum,	"	37 50	
	F. S. Beede,	"	25 00	
	Simon Marshall,	"	10 00	
	F. E. Courtney,	"	10 00	
	Samuel Pearsall,	"	2 17	
	J. F. Shedden,	"	15 56	
	Wm. H. Burnett,	sheriff's fees	2 05	
	Lewis Burgess,	justice's fees	1 50	
	Theo. H. Swift,	attorney's fees	180 61	
	F. O. Conant,	special protector, services,	24 76	
	F. O. Conant,	special protector, services,	8 75	
	M. A. Martin,	justice's fees	6 50	
	J. L. Tucker,	attorney's fees	51 24	
	John F. Bradner,	attorney's fees	10 00	
	A. M. Payne,	justice's fees	11 20	
	C. W. Faulkner,	constable's fees	16 55	
	Landsford Wallace,	justice's fees	6 75	
	F. T. Hulse,	attorney's fees	25 00	
	Richard Pullyblank,	constable's fees	5 40	
	J. H. Marshall,	justice's fees	4 30	
	J. H. Marshall,	justice's fees	2 60	
	Jas. Plopper,	constable's fees	4 80	
	F. O. Conant,	special protector, services,	10 00	
				1,069 64
Sept.	H. B. Linstruth,	moiety	$15 01	
	Willett Kidd,	"	5 00	
	H. B. Linstruth,	"	19 73	
	Wm. H. Burnett,	"	5 90	
	Carlos Hutchins,	"	25 00	
		Forward,	$70 64	$4,518 05

1899.		Brought forward,	$70 64	$4,518 05
Sept.	John B. Rogers,	moiety - - - - -	52	
	Isaiah Vosburgh,	" - - - - -	37 50	
	L. S. Emmons,	" - - - - -	12 00	
	L. S. Emmons,	" - - - - -	12 50	
	L. S. Emmons,	" - - - - -	24 00	
	P. C. Perry,	" - - - - -	4 36	
	A. E. Houghston,	justice's fees - - -	5 40	
	M. J. Beagle,	constable's fees - -	2 65	
	L. S. Emmons,	disbursements - - -	2 50	
	L. J. Tallinger,	constable's fees - -	7 40	
	L. J. Tallinger,	" " - - -	7 10	
	W. H. Manchester,	justice's fees - -	7 65	
	Oren A. Coons,	" " - - -	31 90	
	Daniel Moran,	attorney's services -	20 00	
	E. E. Howe,	" " - -	32 00	
	Duncan D. Cameron,	justice's fees - -	5 60	
	Richard Pullyblank, Jr.,	constable's fees - -	1 50	
	Giles B. Fonda,	justice's fees - -	13 10	
	James D. Straight,	constable's fees - -	8 90	
	John E. Leavitt,	advance for witness fees	50 00	
				356 12
	Total disbursements, - - - - - -			$4,874 17

Trespass on State Lands.

RECEIPTS.

1898.				
Oct.	26. Frank Houghton, - - - - - - - -		$130 80	$130 80
Dec.	5. Oscar Ordway, - - - - - - - -		$50 00	
	24. Alvin Winslow, sale of barn, - - - - -		20 00	70 00
Nov.	9. Robt. Shaw & Son, - - - - - - -		$80 00	80 00
1899.				
Jan.	13. Geo. W. Earl, sale of timber, - - - - -		$618 00	618 00
Feb.	27. John and Andrew Carson, - - - - -		$40 00	40 00
Mch.	1. Isley Bros., sale of wood, - - - - -		$60 00	
	Holmes & Van Allen cases, cash advanced, returned, - - - - - - - - -		18 94	
	2. Oscar Ordway, - - - - - - - - -		100 00	
	14. Milton Barnes, - - - - - - - -		30 00	
	22. John E. Leavitt, sale of wood, - - - -		84 00	
		Forward,	$292 94	$938 80

1899.		Brought forward,	$292 94	$938 80	
Mch.	24.	Hamlet Jansen,	41 87		
	29.	Russell Homes case, returned from money advanced to J. E. Leavitt,	197 36		
				532 17	
April	1.	Andrew J. Baker,	$50 00		
	7.	Andrew J. Baker,	100 55		
		Isley Bros.,	45 25		
	12.	Chas. Bell et al.,	14 50		
	14.	John A. Phillips,	50 00		
		Isley Bros.,	87 30		
	27.	Everett Young,	160 00		
May	8.	Everett Young,	$25 00	507 60	
		Geo. W. Earl, sale of timber,	125 00		
	18.	James Peacock,	48 25		
		David W. Stearns,	50 00		
				248 25	
June	1.	Andrew J. Baker,	$50 00		
		Henry Stevens,	40 00		
	10.	Adelbert Snyder,	25 00		
	12.	Milton H. Maynard,	50 00		
	19.	H. Jensen,	104 85	269 85	
July	4.	J. A. & G. A. Stevens,	$460 00		
		C. Moody, Jr.,	25 00		
		Chas. Decker,	50 00		
		Eli Cottington,	15 00		
		Joseph Perkins,	7 00		
		Bert McGowan,	37 15		
				594 15	
Aug.	3.	Andrew J. Baker,	$100 00		
		H. & J. D. Smith,	47 00		
		Dayton Mosher,	16 15		
		Irving & Geo. Shulenburgh,	46 25		
		Melville Warner,	23 75		
				233 15	
		Total receipts trespass account,		$3,323 97	

DISBURSEMENTS.

1898.				
May	1.	Carlos Hutchins, moiety	$7 25	
		H. L. Wait, "	25 00	
		H. L. Wait, "	15 00	
		Clarence W. Smith, attorney's fees	93 53	
		Isaiah Vosburgh, services	41 88	
		H. L. Wait, disbursements	5 00	
		Forward,	$187 66	

1899.		Brought forward,		$187 66	
May	1. C. E. Phelps,	surveying		19 95	
	E. W. Lindsley,	"		22 75	
	C. A. Taylor,	internal revenue stamps		13 50	
	F. S. Beede,	moiety		24 12	
	D. H. McKinnon,	"		25 00	
	R. H. McIntyre,	attorney's fees		5 00	
	Geo. D. Frank,	certified copy of map		3 00	
	Isaiah Vosburgh,	moiety		20 00	
					$320 98
Aug.	17. Geo. W. Earl,	"	$, 0 55		
	D. H. McKinnon,	"	25 00		
	Clarence W. Smith,	attorney's fees	352 22		
	Jay C. Bardo,	justice's fees	10 30		
	Jay C. Bardo,	" "	6 10		
	Cyrus Durey,	disbursements and services	95 16		
	John E. Leavitt,	disbursements and services	32 24		
	R. H. McIntyre,	justice's fees	3 20		
	E. W. Lindsley,	surveying	48 00		
	Wesley Barnes,	"	42 50		
	D. H. McKinnon,	moiety	25 00		
	R. S. Jones,	"	7 50		
	Isaiah Vosburgh,	"	3 50		
	J. E. Leavitt,	"	18 57		
	C. N. Woodworth,	surveying	63 61		
					733 45
Oct.	5. William Wolf,	disbursements	$9 83		
	Edward Thompson,	"	65 00		
	Carlos Hutchins,	moiety	25 00		
	W. E. Huggard,	surveying	51 00		
1899.					150 83
Jan.	5. E. M. Merrill,	surveying	$20 50		
	Carlos Hutchins,	moiety	25 00		
	E. W. Lindsley,	surveying	68 00		
	Clinton H. Simonds,	"	28 00		
	Wesley Barnes,	"	66 38		
	Harry Reynolds,	"	8 00		
	James Ryan,	"	6 00		
	A. J. Mulligan,	disbursements	6 31		
					228 19
Feb.	6. A. B. Strough,		$18 75		
	E. W. Lindsley,	surveying	59 38		
		Forward,	$78 13		$1,433 45

1899.		Brought forward,	$78 13	$1,433 45
Feb. 6.	Isaac La Grange,	services - -	6 00	
	John E. Leavitt,	advanced for expenses - -	59 22	
				143 35
Mch. 1.	N. H. Anibal,	costs on stay - -	$25 86	
	J. F. Shaw,	board of witnesses -	5 00	
	C. Earl Phelps,	surveying - -	101 42	
	C. N. Woodworth,	" - - -	67 35	
	C. Earl Phelps,	" - - -	24 88	
	M. B. Williams,	expenses attending court - - -	6 00	
	E. W. Lindsley,	surveying - -	68 18	
	J. Newton Fiero,	attorney's fees - -	820 00	
	Cyrus Durey,	attending court -	30 00	
	Fancher & White,	court costs - -	150 00	
				1,298 69
May 1.	Warren Rose,	services - -	$6 30	
	Henry L. Gates,	attorney's fees - -	20 00	
	H. L. Wait,	disbursements -	3 00	
				29 30
Aug. 17.	C. N. Woodworth,	surveying - - -	$36 64	
	C. E. Phelps,	" - - -	83 06	
	Wm. Payne,	" - - -	33 00	
				152 70
Sept. 19.	Isaiah Vosburgh,	moiety - - -	$25 00	
	John E. Leavitt,	" - - - -	23 50	
	John E. Leavitt,	" - - -	8 07	
	Geo. F. Chellis,	surveying - - -	30 00	
	Noah Major,	axeman - -	9 00	
	J. W. Pond,	expenses, Eugene Edwards case - -	46 85	
				142 42
	Total disbursements trespass account,	- - - - -		$3,199 91

Rentals of State Land.

1898.			
Oct. 28.	From Henry Bradley, - - - - - - -	$40 00	
1899.			
July 1.	From J. H. Stott, - - - - - - -	20 00	
			$60 00

Receipts from Shellfish Leases.

1898.			
Oct. 19.	From Edward Thompson, chairman, - - -	$31 82	
Nov. 18.	From Edward Thompson, chairman, - - -	105 97	
Dec. 20.	From Edward Thompson, chairman, - - -	88 55	
	Forward,	$226 34	

1899.	Brought forward,	$226 34	
Jan. 23.	From Edward Thompson, chairman,	147 30	
Feb. 14.	From Edward Thompson, chairman,	777 25	
April 7.	From Edward Thompson, chairman,	105 65	
1898.			
May 10.	From Edward Thompson, chairman,	142 50	
Aug. 9.	From Edward Thompson, chairman,	317 58	
			$1,716 62

Miscellaneous Receipts.

1898.			
Dec. 19.	From Jas. Annin, Jr., sales of whitefish,	$42 20	
1899.			
Jan. 9.	From Jas. Annin, Jr., sales of whitefish,	37 20	
	From Jas. Annin, Jr., rebate on hotel bill,	7 25	
Aug. 16.	From Jas. H. Lamphere, sale of bullheads,	40 18	
			$126 83

Licenses.

During the year ending September 30, 1899, there were issued pursuant to the various provisions of the Fisheries, Game and Forest Law, licenses to net fish as follows:

Lake Ontario	92
Lake Erie	87
Black River bay	27
Chaumont bay	84
Oneida lake	125
Otsego lake	54
Millsite lake	13
Hudson river	198
Delaware river	11
Wappinger creek	3
Wallkill creek	1
Minnow net licenses	78
Total	773

Total receipts	*$1,238 00

The new law providing for licensing nets in Chaumont bay and adjacent waters, and the law requiring the licensing of minnow nets have added very largely to the license work of the Department, and the receipts from this source for the year have nearly doubled.

* For disposition of this money, see Statement of Net License Receipts.

THE FIRST BIRD OF THE SEASON.

TRAPPING.

Schedule of Licenses Issued to Net Fish and of Receipts for Same for Year Ending September 30, 1899.

LICENSEE	RESIDENCE	WATER	NETS	FEES
Neil E. Conway,	Charlotte,	Lake Ontario,	2 gills,	$1 00
Walter E. Galloway,	Dexter,	Black River Bay,	5 fykes,	5 00
Charles Dingman,	"	"	5 "	5 00
Neeland Flander,	Three Mile Bay,	Chaumont Bay, etc.,	3 "	3 00
Hiram Flander,	"	"	5 "	5 00
Perry Rockwood,	Dexter,	"	5 "	5 00
John Phillips,	Pillar Point,	"	3 gills,	3 00
Frank W. Baldwin,	"	"	3 "	3 00
Julius Maynard,	Dexter,	Black River Bay,	5 fykes,	5 00
George Lawton,	"	"	5 "	5 00
Harry Sidman,	"	"	5 "	5 00
William Barber,	Three Mile Bay,	Chaumont Bay, etc.,	5 traps,	5 00
George Silver,	Chaumont,	"	1 gill,	1 00
Wm. Burlingame,	Dexter,	Black River Bay,	5 fykes,	5 00
George Petrie,	"	"	5 "	5 00
William Dick,	Three Mile Bay,	Chaumont Bay, etc.,	5 traps,	5 00
John Dollinger,	Redwood,	Millsite Lake,	3 gills,	3 00
C. R. Springer,	"	"	3 "	3 00
Chester Silver,	Chaumont,	Chaumont Bay, etc.,	1 gill,	1 00
Elsworth Brooks,	"	"	1 ciscoe,	1 00
John W. Fields,	Sacket Harbor,	Black River Bay,	5 fykes,	5 00
John C. Barber,	Three Mile Bay,	Chaumont Bay, etc.,	5 traps,	5 00
Charles Bush,	Redwood,	Millsite Lake,	3 gills,	3 00
			Forward,	$87 00

SCHEDULE OF LICENSES — CONTINUED.

LICENSEE	RESIDENCE	WATER	NETS	FEES
			Brought forward,	$87 00
Milton Lance,	Three Mile Bay,	Chaumont Bay, etc.,	1 trap,	1 00
Simon Failing,	Point Peninsula,	"	5 fykes,	5 00
Geo. N. Maitland,	Pillar Point,	"	1 gill,	1 00
Sheldon Baum,	Brewerton,	Oneida Lake,	1 trap,	1 00
Frank Baum,	"	"	1 "	1 00
E. E. Pierce,	"	"	1 "	1 00
E. J. Pierce,	"	"	1 "	1 00
B. Wood,	"	"	1 "	1 00
D. Wood, Jr.,	"	"	1 "	1 00
Frank Landers,	"	"	1 "	1 00
Anson Landers,	"	"	1 "	1 00
Cicero Walker,	"	"	1 "	1 00
Forrest Walker,	"	"	1 "	1 00
Geo. L. Kathan,	"	"	1 "	1 00
Edsel Landers,	"	"	1 "	1 00
Chervoy Ladd,	"	"	1 "	1 00
F. Ladd,	"	"	1 "	1 00
George F. Lynn,	"	"	1 "	1 00
H. R. Lynn,	"	"	1 "	1 00
C. H. Livingston,	"	"	1 "	1 00
William Ladendorf,	"	"	1 "	1 00
J. H. Davison,	"	"	1 "	1 00
C. F. Davison,	"	"	1 "	1 00
H. S. Dutcher,	"	"	1 "	1 00
			Forward,	$115 00

SCHEDULE OF LICENSES — CONTINUED.

LICENSEE	RESIDENCE	WATER	NETS	FEES
			Brought forward,	$115 00
Arch Dickson,	Brewerton,	Oneida Lake	1 trap,	1 00
Robert Darling,	"	"	1 "	1 00
Wayne Pomeroy,	"	"	1 "	1 00
Jasper Pomeroy,	"	"	1 "	1 00
George Petty,	"	"	1 "	1 00
Rodney Petty,	"	"	1 "	1 00
M. Blummer,	"	"	1 "	1 00
S. L. McAllister,	"	"	1 "	1 00
Frank Nicholson,	"	"	1 "	1 00
E. G. Gale,	"	"	1 "	1 00
William Shafer,	"	"	1 "	1 00
Watson Shaver,	"	"	1 "	1 00
Morris Schell,	"	"	1 "	1 00
George Whitney,	"	"	1 "	1 00
John Meaney,	"	"	1 "	1 00
William Waldron,	"	"	1 "	1 00
Frank Bell,	"	"	1 "	1 00
Wallace D. Rhines,	Constantia,	"	1 "	1 00
James Andrews,	"	"	1 "	1 00
Irving Ladd,	Brewerton,	"	1 "	1 00
D. Ladd,	"	"	1 "	1 00
Henry M. Livermore,	Dexter,	Black River Bay,	5 fykes,	5 00
E. E. Makepeace,	Alexandria Bay,	Millsite Lake,	2 gills,	2 00
C. R. Ladd,	Cigarville,	Oneida Lake,	1 trap,	1 00
			Forward,	$144 00

SCHEDULE OF LICENSES — CONTINUED.

LICENSEE	RESIDENCE	WATER	NETS	FEES
			Brought forward,	$144 00
A. D. Ladd,	Cigarville,	Oneida Lake,	1 trap,	1 00
J. Ladd,	"	"	1 "	1 00
N. Ladd,	Brewerton,	"	1 "	1 00
Albert Shaw,	West Monroe,	"	1 "	1 00
Lorenzo Shaw,	" "	"	1 "	1 00
John Shaw,	" "	"	1 "	1 00
Charles Shaw,	" "	"	1 "	1 00
Ernest Lord,	" "	"	1 "	1 00
Charles Lord,	" "	"	1 "	1 00
John E. Lord,	" "	"	1 "	1 00
Freeman Crowell,	Cicero,	"	1 "	1 00
Charles Crowell,	"	"	1 "	1 00
John Therre,	"	"	1 "	1 00
Phillip Andrews,	"	"	1 "	1 00
Stephen Orman,	Liverpool,	"	1 "	1 00
P. T. Shaver,	Euclid,	"	1 "	1 00
Clinton Smith,	West Monroe,	"	1 "	1 00
Ed. Gaffey,	" "	"	1 "	1 00
Dexter Ostrum,	" "	"	1 "	1 00
Sanford Belknap,	Brewerton,	"	1 "	1 00
John Belknap,	"	"	1 "	1 00
Adelbert Landers,	"	"	1 "	1 00
Albert Wing,	"	"	1 "	1 00
John Schell,	"	"	1 "	1 00
			Forward,	$168 00

SCHEDULE OF LICENSES — CONTINUED.

LICENSEE	RESIDENCE	WATER	NETS	FEES
			Brought forward,	$168 00
Bruce Ladd,	Brewerton,	Oneida Lake,	1 trap,	1 00
Geo. A. Friend,	"	"	1 "	1 00
Fred. Lehman,	Cicero,	"	1 "	1 00
Francis Shaw,	West Monroe,	"	1 "	1 00
William Coleman,	" "	"	1 "	1 00
Elliot E. Roat,	Pillar Point,	Chaumont Bay, etc.,	5 fykes,	5 00
Albert Hinds,	" "	" "	1 gill,	1 00
William Phillips,	West Monroe,	Oneida Lake,	1 trap,	1 00
Edgar Johnston,	Constantia,	"	1 "	1 00
Peter Coleman,	"	"	1 "	1 00
Lina Collins,	Point Peninsula,	Chaumont Bay,	2 gills,	2 00
James Curran,	Dexter,	Black River Bay,	5 fykes,	5 00
Francis Bush,	Redwood,	Millsite Lake,	1 gill,	1 00
Newton Palmer,	Bridgeport,	Oneida Lake,	1 trap,	1 00
Elmer McChesney,	Brewerton,	"	1 "	1 00
B. L. Emmons,	"	"	1 "	1 00
Charles Gunther,	"	"	1 "	1 00
William Davis,	Cicero,	"	1 "	1 00
Henry Crowell,	"	"	1 "	1 00
Nelson Luff,	Henderson Harbor,	Lake Ontario,	2 ciscoes,	2 00
Samuel Overbaugh,	West Camp,	Hudson River,	10 fykes,	1 00
George Arney,	Lakeport,	Oneida Lake,	1 trap,	1 00
Eugene Davidson,	Cigarville,	"	1 "	1 00
Lester G. Collins,	Point Peninsula,	Chaumont Bay,	1 gill,	1 00
			Forward,	$202 00

SCHEDULE OF LICENSES — CONTINUED.

LICENSEE	RESIDENCE	WATER	NETS	FEES
			Brought forward.	$202 00
Peter Pierce,	Redwood,	Millsite Lake,	2 gills,	2 00
Geo. M. Roat,	Pillar Point,	Chaumont Bay, etc.,	3 fykes,	3 00
Arthur Coleman,	Cicero Center,	Oneida Lake,	1 trap,	1 00
Oscar Eaton,	Brewerton,	"	1 "	1 00
Charles Grover,	"	"	1 "	1 00
George Carter,	Lakeport,	"	1 "	1 00
Samuel Arney,	"	"	1 "	1 00
John C. Brezee,	"	"	1 "	1 00
William Graves,	Point Peninsula,	Chaumont Bay,	2 gills,	2 00
Orr B. Stratton,	" "	"	1 gill,	1 00
James A. Lee,	Dexter,	"	5 fykes,	5 00
John Patrick,	"	Black River Bay,	5 "	5 00
C. H. Heath,	Plessis,	Millsite Lake,	2 gills,	2 00
Leander McAllister,	West Monroe,	Oneida Lake,	1 trap,	1 00
F. K. Dickson,	Brewerton,	"	1 "	1 00
Eudell Delamater,	Bridgeport,	"	1 "	1 00
Newton Hopper,	Lakeport,	"	1 "	1 00
George Hildreth,	"	"	1 "	1 00
Charles Arney,	"	"	1 "	1 00
L. H. Wilson,	"	"	1 "	1 00
W. E. Battrill,	Syracuse,	"	1 "	1 00
Henry Feller,	Catskill Station,	Hudson River,	8 fykes,	1 00
H. C. Simons,	Theresa,	Millsite Lake,	2 gills,	2 00
George Place,	Bellville,	Lake Ontario,	1 gill,	1 00
			Forward,	$240 00

SCHEDULE OF LICENSES — CONTINUED.

LICENSEE	RESIDENCE	WATER	NETS	FEES
			Brought forward,	$240 00
Geo. M. Roat,	Pillar Point,	Chaumont Bay, etc.,	8 fykes,	8 00
James Evans,	Cicero,	Oneida Lake,	1 trap,	1 00
John P. Therre,	"	"	1 "	1 00
Leon Phillips,	West Monroe,	"	1 "	1 00
Charles Wessler,	"	"	1 "	1 00
Henry J. Fox,	Bridgeport,	"	1 "	1 00
Gottlieb Rees,	Redwood,	Millsite Lake,	2 gills,	2 00
J. H. Simons,	"	"	2 "	2 00
Arthur Hoatland,	Cicero,	Oneida Lake,	1 trap,	1 00
John Nash,	Brewerton,	"	1 "	1 00
William Cass,	Lakeport,	"	1 "	1 00
H. H. Eaton,	"	"	1 "	1 00
F. B. Tuttle,	Bridgeport,	"	1 "	1 00
Leander H. Soule,	Pillar Point,	Chaumont Bay, etc.,	2 traps,	2 00
Elmer Rhines,	Plessis,	Millsite Lake,	2 gills,	2 00
Wm. E. Dingman,	Redwood,	"	1 gill,	1 00
David Johnston,	West Monroe,	Oneida Lake,	1 trap,	1 00
Edward Jay,	Liverpool,	"	1 seine,	1 00
John Groesbeck,	Bridgeport,	"	1 trap,	1 00
Bert Dean,	"	"	1 "	1 00
Will Tailor,	"	"	1 "	1 00
Duane Smith,	Lakeport,	"	1 "	1 00
Hammond & Gill,	Henderson Harbor,	Lake Ontario,	1 ciscoe,	1 00
George Warner,	Oneida Lake,	Oneida Lake,	1 trap,	1 00
			Forward,	$275 00

SCHEDULE OF LICENSES — CONTINUED.

LICENSEE	RESIDENCE	WATER	NETS	FEES
			Brought forward,	$275 00
W. H. Vandenburg,	Lakeport,	Oneida Lake,	1 trap,	1 00
Warren Vandenburg,	"	"	1 "	1 00
D. W. Thomas,	Cicero,	"	1 "	1 00
Claude Shaw,	West Monroe,	"	1 "	1 00
Robert Hines,	"	"	1 "	1 00
Daniel Shannon,	Redwood,	Millsite Lake,	1 gill,	1 00
Michael Pindle,	Bridgeport,	Oneida Lake,	1 trap,	1 00
Walter Chapman,	Oneida Lake,	"	1 "	1 00
Will Springer,	Lakeport,	"	1 "	1 00
John Springer,	"	"	1 "	1 00
George Ward,	"	"	1 "	1 00
W. H. Stevens,	Henderson Harbor,	Lake Ontario,	1 gill,	1 00
C. D. Rogers,	Chaumont,	Chaumont Bay,	1 "	1 00
Edward L. Hall,	Tivoli,	Hudson River,	3 fykes,	1 00
John McAllister,	Brewerton,	Oneida Lake,	1 seine,	1 00
John A. Failing,	Point Peninsula,	Chaumont Bay, etc,	2 gills,	2 00
Julius Maynard,	Dexter,	"	5 fykes,	5 00
George Lawton,	"	"	5 "	5 00
Henry M. Livermore,	"	"	5 "	5 00
John Patrick,	"	"	5 "	5 00
J. D. Williams,	Poughkeepsie,	Wappinger Creek,	1 gill,	1 00
Ephraim Snyder,	North Germantown,	Hudson River,	14 fykes,	1 00
Lester Miller,	" "	"	20 "	1 00
Geo. W. Petrie,	Dexter,	Black River Bay,	5 "	5 00
			Forward,	$320 00

SCHEDULE OF LICENSES — CONTINUED.

LICENSEE	RESIDENCE	WATER	NETS	FEES
			Brought forward,	$320 00
Harry Sidman,	Dexter,	Black River Bay,	5 fykes,	5 00
Wm. Burlingame,	"	"	5 "	5 00
Walter E. Galloway,	"	"	5 "	5 00
Frank M. Knapp,	"	"	5 "	5 00
James M. Ward,	Sacket Harbor,	"	5 "	5 00
Silas S. Dingman,	Dexter,	"	5 "	5 00
Geo. W. Miller,	Germantown,	Hudson River,	15 "	1 00
Wesley Fredenburgh,	Catskill,	"	15 "	1 00
John Locknell,	North Germantown,	"	20 "	1 00
William Miller, Jr.,	Germantown,	"	5 "	1 00
Jacob Sheffer,	North Germantown,	"	5 "	1 00
Charles Dingman,	Dexter,	Chaumont Bay, etc.,	5 "	5 00
James Williams,	"	"	5 "	5 00
William Lindsey,	Pillar Point,	"	5 "	5 00
Frank W. Baldwin,	"	"	5 "	5 00
Myron Galloway,	Sacket Harbor,	Black River Bay,	5 "	5 00
William Pettit,	" "	"	5 "	5 00
John W. Fields,	" "	"	5 "	5 00
Walter H. Patrick,	Dexter,	"	5 "	5 00
Simon Rockefellow,	Germantown,	Hudson River,	3 "	1 00
E. A. Brandow,	Athens,	"	4 "	1 00
Henry J. Sheffer,	Germantown,	"	10 "	1 00
William Race,	Hudson,	"	30 "	1 00
Oscar Shultis,	Cheviot,	"	20 "	1 00
			Forward,	$400 00

SCHEDULE OF LICENSES — CONTINUED.

LICENSEE	RESIDENCE	WATER	NETS	FEES
			Brought forward,	$400 00
Castle & Knol,	Schodack Landing,	Hudson River,	30 fykes,	1 00
D. W. Secor,	Hudson,	"	20 "	1 00
James A. Lee,	Dexter,	Chaumont Bay, etc.,	5 "	5 00
Elliot E. Roat,	Pillar Point,	"	5 "	5 00
William Baldwin,	"	"	4 traps,	4 00
George M. Roat,	"	"	5 fykes,	5 00
Ransler Proper,	Linlithgo,	Hudson River,	30 "	1 00
Horace E. Kelly,	Tivoli,	"	20 "	1 00
Levi Ham,	Catskill,	"	10 "	1 00
Elliot E. Roat,	Pillar Point,	Chaumont Bay, etc.,	5 traps,	5 00
Eldin H. Sprague,	"	"	5 "	5 00
" "	"	"	5 fykes,	5 00
Chas. B. Burdick,	Pleasant Valley,	Wappinger Creek,	1 gill,	1 00
Cassius M. Smith,	New Hackensack,	"	1 "	1 00
Harry Warner,	Three Mile Bay,	Chaumont Bay, etc,	4 fykes,	4 00
Ephraim Bellinger,	"	"	5 "	5 00
George M. Roat,	Pillar Point,	"	5 "	5 00
William Lindsey,	"	"	5 traps,	5 00
John Spellman,	Catskill Station,	Hudson River,	2 fykes,	1 00
Lewis F. Decker,	"	"	10 "	1 00
Timothy Wilson,	Wilson,	Lake Ontario,	1 gill,	1 00
Wallace Burlingame,	Dexter,	Chaumont Bay, etc.,	5 fykes,	5 00
Silas S. Digman,	"	"	5 "	5 00
John Pilkinton,	Wilson,	Lake Ontario,	1 gill,	1 00
			Forward,	$474 00

SCHEDULE OF LICENSES—CONTINUED.

LICENSEE	RESIDENCE	WATER	NETS	FEES
			Brought forward,	$474 00
James D. Patrick,	Dexter,	Black River Bay,	5 fykes,	5 00
Henry Cohn,	Hudson,	Hudson River,	4 "	1 00
Peter F. Bronk,	Stuyvesant,	"	20 "	1 00
Jas. H. McGilfrey,	Bath,	"	20 "	1 00
Harry Warner,	Three Mile Bay,	Chaumont Bay, etc.,	10 "	10 00
Thomas Murphy,	Watervliet,	Hudson River,	20 "	1 00
Charles Backus,	Chaumont,	Chaumont Bay, etc.,	5 "	5 00
William Wilson,	Wilson,	Lake Ontario,	1 gill,	1 00
George L. Hess,	Sacket Harbor,	Black River Bay,	5 fykes,	5 00
" "	"	"	5 traps,	5 00
Robert Taylor & Son,	Point Breeze,	Lake Ontario,	1 gill,	1 00
" "	"	"	2 sturgeon,	2 00
Perry Rockwood,	Dexter,	Chaumont Bay, etc.,	5 fykes,	5 00
Simon Failing,	Three Mile Bay,	"	5 "	5 00
Isaac A. Shover,	Watervliet,	Hudson River,	1 dip,	1 00
Thomas McKernan,	"	"	30 fykes,	1 00
William R. Stewart,	Dunkirk,	Lake Erie,	1 gill,	1 00
James B. Lynch,	Coxsackie Station,	Hudson River,	1 seine,	1 00
Frank M. Stabel,	Buffalo,	Lake Erie,	2 gills,	2 00
Webster & Krager,	Furnaceville,	Lake Ontario,	4 "	4 00
Ernest Scharff,	Glenmont Station,	Hudson River,	12 fykes,	1 00
David M. Wheeler,	Wilson,	Lake Ontario,	2 gills	2 00
John Wagner,	Youngstown,	"	2 "	2 00
Rance Riddle,	Albany,	Hudson River,	20 fykes,	1 00
			Forward,	$538 00

SCHEDULE OF LICENSES — CONTINUED.

LICENSEE	RESIDENCE	WATER	NETS	FEES
			Brought forward,	$538 00
Hiram Flander,	Three Mile Bay,	Chaumont Bay, etc.,	5 fykes,	5 00
Clarence Vasler,	"	"	10 "	10 00
George Lawton,	Dexter,	"	3 traps,	3 00
Charles Stevens,	Hudson,	Hudson River,	5 fykes,	1 00
J. H. Jennings,	Catskill Station,	"	20 "	1 00
Ansel Stammel,	Rensselaer,	"	7 "	1 00
Lewis Lasher,	Tivoli,	"	6 "	1 00
John H. Hill,	West Camp,	"	20 "	1 00
Fred Maas,	Buffalo,	Lake Erie,	1 seine,	1 00
" "	"	"	3 gills,	3 00
Andrew Van Steenburgh,	Youngstown,	Lake Ontario,	2 "	2 00
Frank L. Powley,	"	"	1 gill,	1 00
Fred Allen,	Dexter,	Black River Bay,	5 traps,	5 00
John Turner,	Youngstown,	Lake Ontario,	1 gill,	1 00
Ephraim Snyder,	North Germantown,	Hudson River,	1 seine,	1 00
Jacob B. Lewis,	Castleton,	"	20 fykes,	1 00
Elliot E. Roat,	Pillar Point,	Chaumont Bay, etc.,	5 traps,	5 00
John Beck,	Buffalo,	Lake Erie,	3 gills,	3 00
Frank Pound,	Athol Springs,	"	1 gill,	1 00
" "	"	"	1 trap,	1 00
James King,	Derby,	"	1 "	1 00
" "	"	"	1 gill,	1 00
James McGregor,	"	"	1 "	1 00
" "	"	"	1 trap,	1 00
			Forward,	$590 00

SCHEDULE OF LICENSES — CONTINUED.

LICENSEE	RESIDENCE	WATER	NETS	FEES
			Brought forward,	$590 00
William Lindsey,	Pillar Point,	Chaumont Bay, etc.,	1 pound,	1 00
John Kehrer,	Glenmont,	Hudson River,	1 seine,	1 00
W. H. Brandow,	Catskill,	"	15 fykes,	1 00
William J. Peckover,	North Evans,	Lake Erie,	1 gill,	1 00
John O'Kiefe,	Buffalo,	"	1 "	1 00
William Boss,	"	"	1 trap,	1 00
Mary L. Best,	Hudson,	Hudson River,	1 seine,	1 00
Charles Martekofsky,	Albany,	"	24 fykes,	1 00
Meseners & Watters,	Dunkirk,	Lake Erie,	1 gill,	1 00
Peter Gregory,	Bath,	Hudson River,	15 fykes,	1 00
Wm. H. Stammel,	Albany,	"	20 "	1 00
" "	"	"	1 seine,	1 00
William Straker,	Buffalo,	Lake Erie,	1 gill,	1 00
Joseph Squire,	"	"	1 "	1 00
Fred Silver,	Chaumont,	Chaumont Bay, etc.,	5 fykes,	5 00
John C. Barber,	Three Mile Bay,	"	10 traps,	10 00
Sylvester A. Randall,	Dexter,	Black River Bay,	5 fykes,	5 00
Charles H. Youngs,	"	"	5 "	5 00
Michael Masheeco,	Buffalo,	Lake Erie,	1 gill,	1 00
D. W. Sinsabaugh,	Coeymans,	Hudson River,	15 fykes	1 00
Wilcox & Edgley,	Columbiaville,	"	30 "	1 00
"	"	"	1 seine,	1 00
Jacob B. Lewis,	Castleton,	"	2 seines	1 00
Patrick Fitzpatrick,	Youngstown,	Lake Ontario,	2 gills,	2 00
			Forward,	$636 00

SCHEDULE OF LICENSES — CONTINUED.

LICENSEE	RESIDENCE	WATER	NETS	FEES
			Brought forward,	$636 00
Henry Feller,	Catskill Station,	Hudson River,	4 fykes	1 00
Morton A. White,	Delhi,	Delaware River,	1 seine,	1 00
B. S. Martin,	Angola,	Lake Erie,	2 gills,	2 00
"	"	"	2 traps,	2 00
Fernando C. Smith,	Pulaski,	Lake Ontario,	3 "	3 00
"	"	"	2 gills,	2 00
Patrick H. Owens,	Watervliet,	Hudson River,	1 seine,	1 00
Frank Rosankranz,	Albany,	"	1 "	1 00
J. H. Allerdice,	Poelsburg,	"	8 fykes,	1 00
Bartel Van Der Wall,	Albany,	"	25 "	1 00
George Wagner,	Youngstown,	Lake Ontario,	2 gills,	1 00
Timothy Sheehan,	Stuyvesant,	Hudson River,	2 seines,	1 00
Fred Van Buskirk,	Green Island,	"	1 seine,	1 00
John A. Robinson,	"	"	1 "	1 00
John A. Gambell,	Carlyon,	Lake Ontario,	1 gill,	1 00
Charles H. Wheeler,	Wilson,	"	1 "	1 00
Daniel J. Kelly,	Buffalo,	Lake Erie,	1 "	1 00
John Locknell,	North Germantown,	Hudson River,	4 gills,	1 00
Charles Trautwein,	Buffalo,	Lake Erie,	1 gill,	1 00
John Desmond,	Dunkirk,	"	1 "	1 00
Wm. H. Comstock & Sons,	Point Breeze,	Lake Ontario,	3 gills,	3 00
Nelson Dingman,	Dexter,	Chaumont Bay, etc.,	1 seine,	1 00
W. E. Getman,	Ilion,	Otsego Lake,	1 "	1 00
Young & Ayres,	Oaksville,	"	1 "	1 00
			Forward,	$667 00

SCHEDULE OF LICENSES — CONTINUED.

LICENSEE	RESIDENCE	WATER	NETS	FEES
			Brought forward,	$667 00
Flansburg & Giladett,	Springfield Center,	Otsego Lake,	1 seine,	1 00
Sullivan & Gano,	Westville,	"	1 "	1 00
R. Proper,	Linlithgo,	Hudson River,	4 gill,	1 00
Arthur Rightmyer,	"	"	2 fyke,	1 00
Jacob M. Askins,	Troy,	"	1 scap,	1 00
Clarence Temple,	Linlithgo,	"	30 fyke,	1 00
F. C. Martin,	Hudson,	"	13 "	1 00
Edward Albertson,	Stuyvesant,	"	1 seine,	1 00
John Silver,	Buffalo,	Lake Erie,	1 gill,	1 00
"	"	"	2 trap,	2 00
Samuel Sheffer,	North Germantown,	Hudson River,	3 drift,	1 00
Lewis J. Elting,	Greendale,	"	10 fyke,	1 00
Ephraim Bellinger,	Three Mile Bay,	Chaumont Bay, etc.,	5 "	5 00
William M. Dick,	"	"	5 trap,	5 00
A. A. Bugbee,	Olcott,	Lake Ontario,	1 gill,	1 00
Silas Noble,	"	"	3 "	3 00
Thomas Corr,	Cape Vincent,	"	1 "	1 00
Wykoff & Peaslee,	East Springfield,	Otsego Lake,	1 seine,	1 00
J. S. De Frate,	Springfield Center,	"	1 "	1 00
James Hanrahan,	Rensselaer,	Hudson River,	12 fyke,	1 00
Edward M. Hover,	Linlithgo,	"	3 gills,	1 00
Hibbard & Webster,	Cooperstown,	Osego Lake,	1 seine,	1 00
Snyder & Stewart,	Springfield Center,	"	1 "	1 00
Myron Galloway,	Sacket Harbor,	Chaumont Bay, etc.,	5 fyke,	5 00
			Forward,	$706 00

SCHEDULE OF LICENSES — CONTINUED.

LICENSEE	RESIDENCE	WATER	NETS	FEES
			Brought forward,	$706 00
F. Bushenfeld,	Cedar Hill,	Hudson River,	10 fyke,	1 00
Truman R. Platner,	Linlithgo,	"	2 gill,	1 00
Eugene Shafer,	Olcott,	Lake Ontario,	1 "	1 00
Albert Hines,	Pillar Point,	"	2 "	2 00
"	"	Chaumont Bay, etc.,	5 fyke,	5 00
"	"	"	3 gill,	3 00
Eldin Sprague,		"	5 fyke,	5 00
Hiram Flander,	Three Mile Bay,	Hudson River,	1 seine,	1 00
Merritt Cady,	Latham,	"	2 "	1 00
Folmsbee & Tobias,	Castleton,	"	1 "	1 00
John Scharff,	Wemple Station,	"	2 "	1 00
Cornelius Best,	Stuyvesant,	"	20 fyke,	1 00
"	"	"	1 dip,	1 00
N. & E. Root,	Green Island,	Lake Erie,	1 gill,	1 00
Patrick McDonough,	Buffalo,	Lake Ontario,	2 sturgeon,	2 00
Wm. Warren & Bro.,	Cape Vincent,	"	1 "	1 00
James Chapman,	"	"	1 gill,	1 00
James A. Martin,	Olcott,	Chaumont Bay, etc.,	1 trap,	1 00
Milton Lance,	Three Mile Bay,	"	5 fyke,	5 00
Nuland Flander,	" "	Otsego Lake,	1 seine,	1 00
Geo. E. Newkirk,	Cooperstown,	"	1 "	1 00
Cooper & Hubbard,	"	Hudson River,	1 "	1 00
C. H. Slingerland,	Coeymans,	"	1 "	1 00
Harvey Southwick,	Schodack Landing,	"	6 fyke,	1 00
Loren Shaver,	Castleton,		Forward,	$746 00

SCHEDULE OF LICENSES — CONTINUED.

LICENSEE	RESIDENCE	WATER	NETS	FEES
			Brought forward,	$746 00
John H. Dyer,	Watervliet,	Hudson River,	1 dip,	1 00
Jesse Cole,	Catskill Station,	"	2 gill,	1 00
George Flicher,	Malden,	"	2 "	1 00
William Swart,	"	"	2 "	1 00
Wm. B. Swart,	"	"	2 "	1 00
J. B. Page,	Derby,	Lake Erie,	1 "	1 00
J. W. Page,	"	"	1 "	1 00
Let. C. & E. Flint,	Sprout Brook,	Otsego Lake,	1 seine,	1 00
Henry W. Bixby,	Deposit,	Delaware River,	1 "	1 00
J. & F. Parrish,	Cooperstown,	Otsego Lake,	1 "	1 00
Funk & Rathbun,	Springfield Center,	"	1 "	1 00
Hogan & Hibbard,	Cooperstown,	"	1 "	1 00
G. H. & E. J. Farquharson,	"	"	1 "	1 00
Perry Rockwood,	Dexter,	Chaumont Bay, etc.,	1 trap,	1 00
"	"	"	4 fyke,	4 00
Henry A. Rich,	Point Breeze,	Lake Ontario,	1 sucker,	1 00
Fred Fitts,	Somerset,	"	1 gill,	1 00
William H. Askins,	Lansingburgh,	Hudson River,	1 seine,	1 00
Chester P. Whitbeck,	Stuyvesant,	"	1 "	1 00
Lester Miller,	No. Germantown,	"	3 gill,	1 00
Frank Shover,	Watervliet,	"	1 dip,	1 00
Snyder & Simmons,	West Camp,	"	1 shad,	1 00
John Oberst,	Buffalo,	Lake Erie,	1 gill,	1 00
Geo. W. Thayer,	Springfield Center,	Otsego Lake,	1 seine,	1 00
			Forward,	$773 00

SCHEDULE OF LICENSES — CONTINUED.

LICENSEE	RESIDENCE	WATER	NETS	FEES
			Brought forward,	$773 00
Clarence Foster,	Springfield Center,	Otsego Lake,	1 seine,	1 00
John W. Keough,	Cooperstown,	"	1 "	1 00
Thomas Denee,	Cape Vincent,	Lake Ontario,	2 gill,	2 00
Fred Helwrig,	Dunkirk,	Lake Erie,	1 "	1 00
Tony Smith,	Buffalo,	"	1 "	1 00
Frank Tinkelpaugh,	Cooperstown,	Otsego Lake,	1 seine,	1 00
Rathbone & Baird,	East Springfield,	"	1 "	1 00
F. & D. House,	Cooperstown,	"	1 "	1 00
Henry Phillips,	"	"	1 "	1 00
William H. Grace,	Furnaceville,	Lake Ontario,	1 gill,	1 00
Willis Woodworth,	"	"	1 "	1 00
George Wicks,	Rensselaer,	Hudson River,	1 seine,	1 00
John Oathout,	Watervliet,	"	1 "	1 00
George N. Sheffer,	Linlithgo,	"	3 gill,	1 00
Snyder & Rightmyer,	"	"	3 "	1 00
Theo. Brandow, Jr.,	Hudson,	"	3 fyke,	1 00
James A. Shaw,	Downsville,	Delaware River,	1 drag,	1 00
Will Clark,	Kuckville,	Lake Ontario,	1 gill,	1 00
John Fitzpatrick,	Youngstown,	"	1 "	1 00
W. L. Ackerman,	Wilson,	"	2 "	2 00
Benj. Overbaugh,	Malden,	Hudson River,	2 drift,	1 00
David Overbaugh,	"	"	2 "	1 00
Geo. W. Turpening,	"	"	2 "	1 00
Isaac Zeilman,	"	"	2 gill,	1 00
			Forward,	$799 00

SCHEDULE OF LICENSES — CONTINUED.

LICENSEE	RESIDENCE	WATER	NETS	FEES
			Brought forward,	$799 00
Edward Overbaugh,	Smith's Landing,	Hudson River,	2 gill,	1 00
David Hallenbeck,	Catskill Station,	"	2 "	1 00
Edward Poquette,	Bethlehem,	"	5 fyke,	1 00
Thomas A. Huddy,	Buffalo,	Lake Erie,	1 sturgeon,	1 00
George W. English,	Dunkirk,	"	2 gill,	2 00
John M. McIntyre,	Irving,	"	2 "	2 00
Augustus R. Briggs,	Coeymans,	Hudson River,	1 seine,	1 00
Walter Flicker,	Malden,	"	2 gill,	1 00
Chas. Rightmyer,	"	"	2 "	1 00
Augustus L. Cross,	Tivoli,	"	2 drift,	1 00
G. W. Drumgold,	No. Germantown,	"	2 "	1 00
Samuel Overbaugh,	West Camp,	"	5 "	1 00
John Miller,	Linlithgo,	"	2 gill,	1 00
Thompson & Stockings,	Hudson,	"	2 "	1 00
William Welch, Jr.,	Wemple,	"	9 fyke,	1 00
Milo C. Radeker,	Colchester,	Delaware River,	1 seine,	1 00
Geo. Aylesworth,	Cooperstown,	Otsego Lake,	1 "	1 00
S. H. Sheldon,	"	"	1 "	1 00
Wm. A. Brockway,	Springfield Center,	"	1 "	1 00
M. D. Eckler,	Cooperstown,	"	1 "	1 00
Frank Macomb,	"	"	1 "	1 00
Cooper & Coleman,	"	"	1 "	1 00
Menzo Miller,	"	"	1 "	1 00
Holcomb & Carter,	"	"	1 "	1 00
			Forward,	$825 00

SCHEDULE OF LICENSES — CONTINUED.

LICENSEE	RESIDENCE	WATER	NETS	FEES
			Brought forward,	$825 00
Peter E. Olendorf,	Cooperstown,	Otsego Lake,	1 seine,	1 00
Alfred Benton,	"	"	1 "	1 00
Parshall & Mason,	"	"	1 "	1 00
Ira Beames,	"	"	1 "	1 00
Ackley & Gillett,	"	"	1 "	1 00
F. M. Gray,	"	"	1 "	1 00
Dell Mallory,	"	"	1 "	1 00
Elder & Short,	"	"	1 "	1 00
David Willsey,	Starkville,	"	1 "	1 00
Thayer & Dingman,	Springfield Center,	"	1 "	1 00
White & Eckerson,	"	"	1 "	1 00
Phillip Shannon,	Watervliet,	Hudson River,	1 dip,	1 00
J. & N. Conine,	Catskill,	"	2 gill,	1 00
Clyde H. Lasher,	No. Germantown,	"	2 drift,	1 00
Clarence English,	Tivoli,	"	2 "	1 00
Matthias Holscher,	Castleton,	"	2 seine,	1 00
"	"	"	20 fyke,	1 00
Charles Austin,	Stottville,	"	1 seine,	1 00
James A. Elting,	Greendale,	"	2 gill,	1 00
Frank Nutz,	Buffalo,	Lake Erie,	2 "	2 00
Gazley & Hull,	Cooperstown,	Otsego Lake,	1 seine,	1 00
William C. Delong,	Starkville,	"	1 "	1 00
Luther Degarmo,	"	"	1 "	1 00
Chas. C. Lockwood,	Olcott,	Lake Ontario,	1 gill,	1 00
			Forward,	$850 00

SCHEDULE OF LICENSES — CONTINUED.

LICENSEE	RESIDENCE	WATER	NETS	FEES
			Brought forward,	$850 00
Ansel Westcott,	Yates,	Lake Ontario,	1 gill,	1 00
Smith & Pierce,	Springfield Center,	Otsego Lake,	1 seine,	1 00
Jessie A. Folmsbee,	Castleton,	Hudson River,	8 fyke,	1 00
Fred. Moore,	North Germantown,	"	1 drift,	1 00
Henry Funk,	Linlithgo,	"	1 "	1 00
John McKittrick,	Athens,	"	2 gill,	1 00
Thos. P. Gardner,	West Camp,	"	2 "	1 00
Peter F. Bronk,	Stuyvesant,	"	1 seine,	1 00
Martin Coon,	North Germantown,	"	2 drift,	1 00
Ephraim Snyder,	"	"	2 gill,	1 00
Geo. Fredenburgh,	Catskill,	"	3 drift,	1 00
George Denue,	Watervliet,	"	2 seine,	1 00
A. C. Baker,	Dunkirk,	Lake Erie,	1 gill,	1 00
Chas. H. Wheeler,	Wilson,	Lake Ontario,	1 "	1 00
C. F. James,	Chaumont,	"	5 sturgeon,	5 00
William Baldwin,	Pillar Point,	"	1 gill,	1 00
William Lindsey,	"	Chaumont Bay, etc.,	2	2 00
Henry Askins,	Troy,	Hudson River,	1 seine,	1 00
W. S. Castle,	Schodack Landing,	"	2 "	1 00
A. P. Sharpsteen,	Barker,	Lake Ontario,	1 gill,	1 00
Van Ness P. Cooper,	Cooperstown,	Otsego Lake,	1 seine,	1 00
Michael Little,	"	"	1 "	1 00
William H. Halleck,	Harvard,	Delaware River,	2	2 00
Charles E. Gregory,	Downsville,	"	1	1 00
			Forward,	$880 00

SCHEDULE OF LICENSES — CONTINUED.

LICENSEE	RESIDENCE	WATER	NETS	FEES
			Brought forward,	$880 00
John S. Melius,	Bath,	Hudson River,	1 gill,	1 00
Benjamin Madlin,	Coeymans,	"	1 seine,	1 00
Herbert Wolfe,	Catskill,	"	2 drift,	1 00
J. M. Van Loon,	Coxsackie,	"	2 seine,	1 00
Charles Rockefeller,	Cheviot,	"	3 gill,	1 00
George Shultis,	"	"	2 drift,	1 00
Miller & Shultis,	"	"	2 seine,	1 00
George Zeilman,	Malden,	"	2 drift,	1 00
Eben S. Brazier,	Cedar Hill,	"	1 seine,	1 00
James S. Coons,	North Germantown,	"	2 drift,	1 00
David Gregg,	Rensselaer,	"	1 gill,	1 00
John Mason,	Texas,	Lake Ontario,	1 sturgeon,	1 00
Alpheus Simmons,	Tivoli,	Hudson River,	2 "	1 00
Henry Schamerhorn,	Athens,	"	1 gill,	1 00
Theo. F. Clark,	Watervliet,	"	1 seine,	1 00
J. F. Titus,	Blasdell,	Lake Erie,	1 gill,	1 00
Charles Groat,	Irving,	"	1 "	1 00
Robert Hoot & Son,	Point Breeze,	Lake Ontario,	1 sturgeon,	1 00
William Dick,	Three Mile Bay,	"	1 "	1 00
Chas. H. Sabin,	No. Fair Haven,	"	1 gill,	1 00
Chas. H. Jones,	Marshville,	Otsego Lake,	1 seine,	1 00
Jas. H. Rightmyer,	Malden,	Hudson River,	2 drift,	1 00
Jerry O'Brian,	"	"	2 "	1 00
John J. Pindar,	Catskill,	"	5 seine,	5 00
			Forward,	$908 00

SCHEDULE OF LICENSES — CONTINUED.

LICENSEE	RESIDENCE	WATER	NETS	FEES
			Brought forward,	$908 00
Gardner & Lewis,	Smith's Landing,	Hudson River,	2 gill,	1 00
Charles Wood,	Coxsackie,	"	1 "	1 00
William Race,	Hudson,	"	1 drift,	1 00
Henry Morean,	Evans Center,	Lake Erie,	2 gill,	2 00
Peter Gregory,	Bath,	Hudson River,	1 seine,	1 00
Percy Fredenburgh,	Catskill,	"	2 gill,	1 00
Robert Bruce Sheffer,	"	"	2 "	1 00
James H. Greene,	Coxsackie,	"	1 drift,	1 00
John C. Barber,	Three Mile Bay,	Lake Ontario,	3 sturgeon,	3 00
G. & R. Phillips,	Cape Vincent,	"	1 gill,	1 00
Geo. B. Martin,	Olcott,	"	1 "	1 00
John Hooper,	Athol Springs,	Lake Erie,	1 "	1 00
Chas. H. Bogert,	Downsville,	Delaware River,	1 drag,	1 00
James W. Fuller,	"	"	1 "	1 00
John H. Plass,	Catskill Station,	Hudson River,	2 gill,	1 00
E. Briggs,	Coxsackie,	"	1 "	1 00
Thomas McKernan,	Watervliet,	"	1 seine,	1 00
Chas. S. Van Dusen,	Hudson,	"	2 gill,	1 00
Smith & Feroe,	Tivoli,	"	3 "	1 00
Clark Boner,	Youngstown,	Lake Ontario,	2 "	1 00
Frank Boquard,	Buffalo,	Lake Erie,	1 "	1 00
John H. Salpaugh,	Cheviot,	Hudson River,	4 seine,	1 00
Henry L. Moose,	West Camp,	"	4 gill,	1 00
Leonard Earle,	Greenport,	"	1 drift,	1 00
			Forward,	$935 00

SCHEDULE OF LICENSES — CONTINUED.

LICENSEE	RESIDENCE	WATER	NETS	FEES
			Brought forward,	$935 00
Theo. Brandow, Jr.,	Hudson,	Hudson River,	2 gill,	1 00
Owen McLaughlin,	Troy,	"	1 scap,	1 00
L. A. Rowland,	Shinhopple,	Delaware River,	1 seine,	1 00
Charles H. Hood,	"	"	1 "	1 00
Henry Burg,	Dunkirk,	Lake Erie,	1 gill,	1 00
J. T. McDonald,	"	"	1 "	1 00
M. J. Kelly,	"	"	1 "	1 00
J. J. Miniger,	Westfield,	"	1 "	1 00
Jacob Pfeister,	Buffalo,	"	1 "	1 00
Henry H. Waring,	Lake Side Park,	Lake Ontario,	1 "	1 00
J. W. Lattin,	Irving,	Lake Erie,	1 "	1 00
Emanuel Joseph,	Buffalo,	"	1 "	1 00
H. J. McEwen,	Evans,	"	2 "	2 00
Baird & Cotton,	East Springfield,	Otsego Lake,	1 seine,	1 00
Harvey Warner,	Three Mile Bay,	Lake Ontario,	2 sturgeon,	2 00
Clarence Vasler,	"	"	1 "	1 00
Alex. D. Lathrop,	Stockport,	Hudson River,	1 drift,	1 00
Parker & Carter,	Coxsackie,	"	1 "	1 00
Anton Ahart,	Buffalo,	Lake Erie,	1 sturgeon,	1 00
Henry D. Face,	Evans,	"	1 "	1 00
John Klee,	West Seneca,	"	1 gill,	1 00
Edward Albertson,	Stuyvesant,	Hudson River,	1 drift,	1 00
Harry D. Bitley,	Watervliet,	"	1 seine,	1 00
Thos. H. Whitbeck,	Stuyvesant,	"	1 "	1 00
			Forward,	$961 00

SCHEDULE OF LICENSES—CONTINUED.

LICENSEE	RESIDENCE	WATER	NETS	FEES
			Brought forward,	$961 00
Isaac Spanburgh,	Coxsackie,	Hudson River,	2 gill,	1 00
Oscar C. Hill,	West Camp,	"	2 "	1 00
Van Court & Reed,	Cooperstown,	Otsego Lake,	1 seine,	1 00
J. H. Williams,	Silver Creek,	Lake Erie,	1 trap,	1 00
"	"	"	1 sturgeon,	1 00
Emery F. Tryon,	Pulaski,	Lake Ontario,	1 "	1 00
"	"	"	1 trap,	1 00
Anthony Feller,	Catskill Station,	Hudson River,	2 gill,	1 00
Albert Ahlers,	Angola,	Lake Erie,	1 sturgeon,	1 00
Lewis W. Cashdollar,	Madalin,	Hudson River,	2 gill,	1 00
Lewis Wilcox,	Columbiaville,	"	1 drift,	1 00
Holland & Bromley,	Angola,	Lake Erie,	1 sturgeon,	1 00
Henry Peterson,	"	"	2 gill,	2 00
Frank Aikins,	Olcott,	Lake Ontario,	1 "	1 00
William Beard,	Pultneyville,	"	2 "	2 00
Daniel J. Greiser,	Youngstown,	"	1 "	1 00
Jerry Driscoll,	Dunkirk,	Lake Erie,	1 "	1 00
Oscar Shultis,	Cheviot,	Hudson River,	2 sturgeon,	1 00
Peter Nelson,	Angola,	Lake Erie,	1 sucker,	1 00
Dean Blodgett,	Westfield,	"	1 gill,	1 00
Chriss. Schlinker,	Smith's Landing,	Hudson River,	2 drift,	1 00
W. C. Salpaugh,	North Germantown,	"	2 "	1 00
George Ryder,	Hudson,	"	1 "	1 00
J. C. Bush,	Columbiaville,	"	2 "	1 00
			Forward,	$987 00

SCHEDULE OF LICENSES — CONTINUED.

LICENSEE	RESIDENCE	WATER	NETS	FEES
			Brought forward,	$987 00
Arthur C. Stannard,	Springfield Center,	Otsego Lake,	1 seine,	1 00
David M. Wheeler,	Wilson,	Lake Ontario,	3 gill,	3 00
Lewis H. Brown,	Port Ontario,	"	5 trap,	5 00
Clarence Jackway,	Cushing,	Lake Erie,	1 "	1 00
Michael F. Dunn,	Buffalo,	"	1 gill,	1 00
Joseph B. Hokamp,	"	"	1 sturgeon,	1 00
James H. Cain,	Troy,	Hudson River,	1 drop,	1 00
Harry H. Boyd,	Dunkirk,	Lake Erie,	1 gill,	1 00
Ward Bryant,	Union Grove,	Delaware River,	2 seine,	2 00
Garry Tifft,	Port Ontario,	Lake Ontario,	2 gill,	2 00
H. B. Whitbeck,	Stuyvesant,	Hudson River,	1 drift,	1 00
Joseph Sweet,	Blasdell,	Lake Erie,	1 sturgeon,	1 00
John F. Titus,	"	"	1 "	1 00
Herman Myers,	Buffalo,	"	1 gill,	1 00
Edgar D. Sheffer,	Catskill,	Hudson River,	1 herring,	1 00
Peter Coit,	Buffalo,	Lake Erie,	1 gill,	1 00
Chas. G. Strifler,	"	"	1 trap,	1 00
W. H. Jackway,	Westfield,	"	1 "	1 00
P. G. Fisk,	Springfield Center,	Otsego Lake,	1 seine,	1 00
Daniel J. Griesser,	Youngstown,	Lake Ontario,	1 trap,	1 00
E. B. Horton,	Henderson Harbor,	"	1 gill,	1 00
Wm. F. Heath,	Alexandria Bay,	St. Lawrence River,	1 minnow,	1 00
W. R. Patterson,	"	"	1 "	1 00
Julius Gladd,	"	"	1 "	1 00
			Forward,	$1,019 00

SCHEDULE OF LICENSES — CONTINUED.

LICENSEE	RESIDENCE	WATER	NETS	FEES
			Brought forward,	$1,019 00
S. W. McCue,	Alexandria Bay,	St. Lawrence River,	1 minnow,	1 00
William H. Pelow,	Clayton,	"	1 "	1 00
Edwin Heath,	Alexandria Bay,	"	1 "	1 00
Justus H. Potter,	Cooperstown,	Otsego Lake,	1 seine,	1 00
John A. Barton,	Lake View,	Lake Erie,	1 gill,	1 00
"	"	"	1 trap,	1 00
George Place,	Woodville,	Lake Ontario,	2 sturgeon,	2 00
"	"	"	1 gill,	1 00
Chas. Tillotson,	Evans,	Lake Erie,	1 sturgeon,	1 00
"	"	"	1 gill,	1 00
Edward L. Sargent,	Watertown,	St. Lawrence River,	1 minnow,	1 00
Anson Kring,	Omar,	"	1 "	1 00
Wm. Cuppernull,	Thousand Island Park,	"	1 "	1 00
Fred Latart,	Clayton,	"	1 "	1 00
G. W. Brown,	"	"	1 "	1 00
Fred Lalonde,	"	"	1 "	1 00
Edgar J. Hoadley,	Alexandria Bay,	"	1 "	1 00
Warren Hoadley,	"	"	1 "	1 00
W. Adkins,	"	"	1 "	1 00
James L. Steele,	Clayton,	"	1 "	1 00
George Perrigo,	"	"	1 "	1 00
Ralph R. Dunny,	"	"	1 "	1 00
Geo. H. Danough,	Thousand Island Park,	"	1 "	1 00
Horace Brown,	Alexandria Bay,	"	1 "	2 00
			Forward,	$1,045 00

SCHEDULE OF LICENSES—CONTINUED.

LICENSEE	RESIDENCE	WATER	NETS	FEES
			Brought forward,	$1,045 00
George Wright,	Hilton,	Lake Ontario,	2 gill,	2 00
Milton Delavergne,	"	"	1 "	1 00
William Hogadorn,	Woodville,	"	1 "	1 00
R. J. Bannerman,	Somerset,	"	1 "	1 00
Fred Tryon,	Sandy Creek,	"	1 sturgeon,	1 00
"	"	"	2 fyke,	2 00
Hiram Cuppernull,	Thousand Island Park,	St. Lawrence River,	1 minnow,	1 00
Winnie & Roche,	Carlton,	Lake Ontario,	1 gill,	1 00
Eli J. Roderick,	Clayton,	Catfish Creek, etc.,	1 minnow,	1 00
Albert Goolah,	"	"	1 "	1 00
George Wagoner,	Alexandria Bay,	St. Lawrence River,	1 "	1 00
John Dollinger,	Redwood,	Butterfield Lake,	1 "	1 00
Lewis W. Day,	Sacket Harbor,	Henderson Bay,	1 "	1 00
Barnard G. Parker,	Gouverneur,	St. Lawrence River,	1 "	1 00
Simon Failing,	Point Peninsula,	Lake Ontario,	3 gill,	3 00
Henry B. Howell,	Medina,	"	1 "	1 00
Myron H. Mosher,	Angola,	Lake Erie,	2 trap,	2 00
Joseph Edwards,	Lake View,	"	1 gill,	1 00
Charles E. Denner,	Chippewa Bay,	St. Lawrence River,	1 minnow,	1 00
O. S. Osterhout,	Oswego,	Lake Ontario,	1 "	1 00
George Perrigo,	Clayton,	Catfish Creek, etc.,	1 "	1 00
T. C. Luther,	Mayville,	Saratoga Lake,	1 "	1 00
Theron S. Couch,	Clayton,	St. Lawrence River,	1 "	1 00
H. Otto Wagner,	Youngstown,	Lake Ontario,	1 gill,	1 00
			Forward,	$1,074 00

SCHEDULE OF LICENSES — CONTINUED.

LICENSEE	RESIDENCE	WATER	NETS	FEES
			Brought forward,	$1,074 00
Leslie Carter,	Fair Haven,	Lake Ontario,	1 gill,	1 00
"	"	"	4 trap,	4 00
R. M. Patchin,	Naples,	Canandaigua and Conesus,	1 minnow,	1 00
Napoleon B. Colon,	Clayton,	St. Lawrence River,	1 "	1 00
George B. Horton,	Chaumont,	Chaumont Bay,	1 gill,	1 00
Alfred Olson,	Buffalo,	Lake Erie,	1 "	1 00
"	"	"	1 trap,	1 00
Eli La Bar,	West Webster,	Tiskie's Pond,	1 minnow,	1 00
George Van Horn,	Cooperstown,	Otsego Bay,	1 "	1 00
Daniel Smith,	Sackets Harbor,	Henderson Bay, etc.,	1 "	1 00
William Stevenson, Jr.,	"	"	1 "	1 00
Orin Boulton,	"	"	1 "	1 00
W. W. Tyler,	"	"	1 "	1 00
E. A. Wakeley,	Westfield,	Lake Erie,	1 gill,	1 00
Richard C. Mosher,	Texas,	Lake Ontario,	2 sturgeon,	2 00
W. E. Shaeffer,	Lockport,	"	1 gill,	1 00
P. W. Koppenhauer,	Sacket Harbor,	Henderson Bay, etc.,	1 minnow,	1 00
Taylor, Fiebig & Jennings,	Candor,	Catstonk Creek,	1 "	1 00
Henry C. Carr,	Union Springs,	Cayuga Lake,	1 "	1 00
Frank Solar,	Chaumont,	Chaumont Bay,	1 "	1 00
Eugene Shafer,	Olcott,	Lake Ontario,	1 gill,	1 00
Charles E. Gray,	Cooperstown,	Otsego Lake,	1 seine,	1 00
John Colton,	Sackets Harbor,	Henderson Bay, etc.,	1 minnow,	1 00
W. B. Camp,	"	"	1 "	1 00
			Forward,	$1,102 00

SCHEDULE OF LICENSES — CONTINUED.

LICENSEE	RESIDENCE	WATER	NETS	FEES
			Brought forward,	$1,102 00
L. S. Strough,	Wellesley,	St. Lawrence River,	1 minnow,	1 00
Geo. E. Squier,	Seneca Falls,	Cayuga Lake, etc.,	1 "	1 00
Jesse W. Bond,	Cooperstown,	Otsego Lake,	1 seine,	1 00
John Mundt,	Auburn,	Cayuga Lake,	1 minnow,	1 00
Henry Kenny,	Olcott,	Lake Ontario, etc.,	1 "	1 00
John Schwartz,	Youngstown,	Lake Ontario,	1 gill,	1 00
Howard H. Widener,	Grenell,	St. Lawrence River,	1 minnow,	1 00
H. A. Morse,	Black Lake,	Black Lake, etc.,	1 "	1 00
John Mundt,	Auburn,	Cayuga Lake,	1 "	1 00
Henry Kenny,	Olcott,	Lake Ontario, etc.,	1 "	1 00
John Schwartz,	Youngstown,	Lake Ontario,	1 gill,	1 00
Howard H. Widener,	Grenell,	St. Lawrence River,	1 minnow,	1 00
Isaac J. Depuy,	Munda,	Silver Lake,	1 "	1 00
Harry W. Watrous,	Hague,	Lake George,	1 "	1 00
H. J. Perry,	Edwardsville,	Black Lake,	1 "	1 00
Lewis L. Holman,	Seneca Falls,	Cayuga Lake,	1 "	1 00
Edwin R. Adams	Dexter,	Griffins Bay,	1 "	1 00
Lee Warner,	Kuckville,	Lake Ontario,	1 gill,	1 00
Percy E. Trinder,	Lake View,	Lake Erie,	1 trap,	1 00
Thomas V. Horton,	Peekskill,	Lake Mohegan,	1 minnow,	1 00
Ira W. Hills,	No. Fair Haven,	Lake Ontario,	1 "	1 00
Reuben White,	Alexandria Bay,	St. Lawrence River,	1 "	1 00
Mary C. Luther,	Wayville,	Saratoga Lake,	1 "	1 00
Frank Thompson,	Kuckville,	Lake Ontario,	gill,	1 00
			Forward,	$1,126 00

SCHEDULE OF LICENSES — CONTINUED.

LICENSEE	RESIDENCE	WATER	NETS	FEES
			Brought forward,	$1,126 00
J. N. Vangorden,	Breesport,	Lake Lamoka,	1 minnow,	1 00
J. N. Waltam,	Sackets Harbor,	Lake Ontario,	1 "	1 00
Henry J. Denner,	Chippewa Bay,	St. Lawrence River,	1 "	1 00
William E. Sprague,	Sandy Creek,	Lake Ontario,	2 fykes,	2 00
E. H. Roberts,	"	"	2 "	2 00
Henry Fredenburgh,	Catskill,	Hudson River,	1 sturgeon,	1 00
John Kinnicutt,	Albany,	"	20 fykes,	1 00
Richard La Flair,	Lisbon,	St. Lawrence River,	1 minnow,	1 00
Edson C. Robinson,	Canandaigua,	Canandaigua Lake,	1 "	1 00
Fred Mundt,	Cayuga,	Cayuga Lake,	1 "	1 00
William Hill,	Coxsackie,	Hudson River,	20 fykes,	1 00
W. Mansfield,	Cayuga,	Cayuga Lake,	1 minnow,	1 00
Chas. Rightmyer,	Malden,	Hudson River,	6 fykes,	1 00
Geo. N. Sheffer,	Linlithgo,	"	30 "	1 00
Wm. B. Millard,	Rouses Point,	Lake Champlain, etc.,	1 minnow,	1 00
Elias P. Rockefeller,	Nassau,	Valatia Kill, etc.,	1 "	1 00
Frank Allison,	Point Breeze,	Lake Ontario,	1 sturgeon,	1 00
Samuel G. Melius,	Saugerties,	Hudson River,	15 fykes,	1 00
Henry Fellers,	Catskill Station,	"	3 "	1 00
Theodore Tutsal,	Coxsackie,	"	10 "	1 00
J. M. Van Loon,	"	"	13 "	1 00
John McCarthy,	Glenmont,	"	12 "	1 00
Charles Tryon,	Sandy Creek,	Deer and Mud Creek, etc.,	1 minnow,	1 00
Martin Kelm,	Lake View,	Lake Erie,	1 gill,	1 00
			Forward,	$1,152 00

SCHEDULE OF LICENSES — CONTINUED.

LICENSEE	RESIDENCE	WATER	NETS	FEES
			Brought forward,	$1,152 00
John Siewert,	Wanakah,	Lake Erie,	1 gill,	1 00
Len H. Stoors,	Tyrone,	Lake Lamoka,	1 minnow,	1 00
Frank Baldwin,	Pillar Point,	Chaumont Bay, etc.,	5 fykes,	5 00
"	"	"	5 "	5 00
Henry S. Davis,	Canandaigua,	Canandaigua Lake,	1 minnow,	1 00
Wm. Sherman Lord,	"	"	1 "	1 00
Robert Hoot & Son,	Point Breeze,	Lake Ontario,	1 gill,	1 00
Winnie & Roche,	Carlton,	"	1 "	1 00
John Phillips,	Pillar Point,	Chaumont Bay, etc.,	3 gill,	3 00
George Owen,	Dunkirk,	Lake Erie,	4 "	4 00
Henry Stilan,	Coeymans,	Hudson River,	15 fykes,	1 00
William M. Dick,	Three Mile Bay,	Chaumont Bay, etc.,	5 traps,	5 00
John C. Barber,	"	"	5 "	5 00
Harvey Warner,	"	"	2 "	2 00
Alfred E. May,	Rochester,	Lake Ontario,	1 minnow,	1 00
Fordis H. Dunham,	Chaumont,	Chaumont Bay, etc.,	5 fykes,	5 00
"	"	"	1 ciscoe,	1 00
Lester Nugent,	"	"	1 "	1 00
"	"	"	5 fykes,	5 00
Clarence Vasler,	Three Mile Bay,	"	10 "	10 00
J. C. Guernsey,	Chaumont,	"	4 "	4 00
Geo. A. Crandall,	Dexter,	Black River Bay,	4 "	4 00
Chas. F. Sidman,	"	"	5 "	5 00
Joshua Ward,	Cornwall Landing,	Wallkill River,	2 seines,	2 00
			Forward,	$1,225 00

SCHEDULE OF LICENSES — CONTINUED.

LICENSEE	RESIDENCE	WATER	NETS	FEES
			Brought forward,	$1,225 00
Robert Taylor,	Point Breeze,	Lake Ontario,	1 gill,	1 00
Emery Tryon,	Pulaski,	"	1 sturgeon,	1 00
William M. Barber,	Three Mile Bay,	Chaumont Bay, etc.,	10 traps,	10 00
M. V. B. Sutherland,	Stuyvesant,	Hudson River,	10 fykes,	1 00
			Total receipts,	$1,238 00

SUMMARY

Lake Ontario,	Licenses,	92
Lake Erie,	"	87
Chaumont Bay, etc.,	"	84
Black River Bay,	"	27
Otsego Lake,	"	54
Oneida Lake,	"	125
Millsite Lake	"	13
Hudson River,	"	198
Delaware River,	"	11
Wallkill River,	"	1
Wappinger Creek,	"	3
Minnow Net,	"	78
Number of licenses,		773

A FINE GAME — SEA BASS.

Report of the Shellfish Commissioner.

To the Fisheries, Game and Forest Commission:

GENTLEMEN.— I have the honor of transmitting the following report of the Shellfish Department of the Fisheries, Game and Forest Commission, of which I have charge, covering the period from October 1, 1898, to October 1, 1899.

During the past year we have received forty-two applications for oyster grounds covering 1,303 acres located in Long Island sound, Raritan bay and Jamaica bay, principally in the latter water. This shows an increase in the acreage applied for, over the fiscal year ending October 1, 1898, of 163 acres.

These applications have been duly granted after surveying, advertising and selling, as provided for by law.

I believe the coming year will be one of greater advancement to the oyster interests of the State, as the greatest set of young oysters ever occurring in any one year came as a reward to those who worked their grounds. The prospect of our seed-buying oystermen being able to obtain their plants from our own waters in the future will enable them to get their seed in much better condition and for less money than formerly.

The set has been so universal with all who prepared their ground that none can complain. Encouragement is thus given to others to take up grounds in the near future.

It must not be forgotten that with the set of young oysters come also a set of young star fish. This will require the constant attention of the oystermen, as the star fish must be destroyed or they will certainly ruin the oysters. With the improved appliances now in use up-to-date oystermen can successfully cope with these enemies of the oyster.

Long Island sound is the principal field of this State for seed oyster raising.

The marketable oysters are in good condition, and, although the price is low, the oystermen are encouraged, as the growth of the past year has been unusually good.

All of which is respectfully submitted.

EDWARD THOMPSON,

Shellfish Commissioner.

Report of Superintendent of Hatcheries.

CALEDONIA, *October* 2, 1899.

To the Commissioners of Fisheries, Game and Forests, Albany, N. Y.:

GENTLEMEN.— The output of the hatcheries for the year closing September 30th, was valuable and satisfactory.

On account of very low temperature and severe storms on the coast during the winter of 1898–99, the employes of your Long Island hatchery were unable to collect the usual number of tom-cod and smelt eggs. On this account the yearly output falls below last year's, but by referring to my report, or summary, for 1899 (hereto attached), it will be seen that there has been a gain over the previous year in all the valuable fishes. More fry, fingerling and yearling trout of all kinds have been sent out, and more bass, pike-perch, muscalonge, shad and whitefish have been hatched and planted than ever before.

From all parts of the State where attention has been paid to stocking the waters come satisfactory reports and congratulations on the decided improvement in the fishing, and calls for fingerling and yearling fish continue to increase.

One thousand three hundred and twenty-five applications for fish were entered in your application books during the year. Of this number 1,253 were filled, and the remainder, 72, were rejected on account of their being duplicates, or for water unfit for the fish named in the applications. This exceeds by 220 applications the number received in any previous year. This of itself shows the confidence people have in the restocking of our State waters.

I find that the applications are made by all classes of citizens. It often happens that for some cause no applications are received for stocking some very desirable waters in the State. When this neglect becomes apparent, I report the matter to the Hatchery Committee, and always receive instructions to send a suitable number of fish to the nearest railroad station, providing that I can find reliable people that will meet the fish at the railroad with the proper transportation and help to deliver them at the stream or lake for which they are intended. Millions of fish have been sent out in this manner during the past year.

At this point it may not be out of place to mention a few facts in connection with the yearly distribution, to show the amount of labor connected with the work.

Seventeen thousand five hundred and ninety-eight cans of fish were sent out from your hatcheries during the year. The State fish car made over fifty trips. The average load for the car was about 110 cans, so that the balance of about 11,000 cans went in charge of attendants in the regular train baggage cars, or were delivered by wagon or boat. The cans used in the distribution vary in size. The smallest ones hold seven gallons of water, and the largest about fifteen gallons. From 50 to 300 fingerling are sent in a can, the number depending on the size of the fish and the size of the can used. From 40 to 100 yearlings are sent in a can, the size regulating the number. Generally not more than 20 small cans or 12 large cans are sent by one attendant on a trip, as that is all one man can properly attend to. The loss of fish in transportation has been less than one-half of one per cent. during the past year.

Nearly all of the railroads of the State kindly continue the practice of hauling the State fish car free, and also furnish free transportation for attendants in charge of fish or fish eggs in the baggage cars of their lines.

I am pleased to report that about 800,000 fingerlings are now on hand, and that applications are also at hand calling for the allotment of more than half that number before the first of January.

It may be desirable to mention localities where the fishing has been improved by liberal stocking. Two once famous trout streams, the Beaverkill and Willowemoc rivers in Sullivan county, are striking examples. They are large streams, twenty to forty miles long, and during the past season it was very common to hear of catches of from eight to twelve pounds of trout per day for a single fisherman, and during at least two months of the fishing season I will venture to say these two streams are fished by at least 100 fishermen per day, and all meet with more or less success. Three to five years ago a day's catch of eight pounds of trout was the talk of the whole section.

In Orange county the board of supervisors made a small appropriation to pay the expenses for the proper distribution of the State fish delivered to points on the railroad by the State employees. Mr. John Wilkin, of Middletown, generally has charge of the work, and he is very particular to see that the trout are well distributed in all the small tributaries of the larger streams, and the bass and pike-perch in the proper waters only. His reports to me show a wonderful improvement in the fishing in that county. Mr. Wilkin writes that "during the past summer pike-perch were caught in some of their small lakes, weighing over three pounds; that these lakes never contained pike-perch until after he commenced planting the fry received from the State, and that the trout fishing has greatly improved."

The same improvement is noted in Delaware and Ulster county streams. Amsterdam, Johnstown and Gloversville fishermen inform me that the fishing during the past year in Fulton and Saratoga county streams has been beyond their expectations, and that from waters stocked by them with yearling brown trout three years ago, they caught the same the past summer weighing from one to two and one-half pounds each, and that previous to three years ago the waters did not contain a single brown trout.

Many brooks and good-sized streams in Westchester, Putnam, Dutchess and Columbia counties, that for the past three years have been granted a few hundred brook, brown and rainbow trout in addition to the grant of young fry, have during the past season furnished a surprisingly large number of good catches.

Ask the trainmen on railroads running through a fishing or shooting section in regard to the sport, and you will always find at least one on every train that is authority in regard to the condition of the streams, and the luck the fishermen and shooters are having. This past season these men report trout as very plentiful in almost all the trout regions.

People in the northern counties, or Adirondack region, write that if it was not for the planting of trout by the State, they are satisfied their waters would be destitute of trout to-day.

Two years ago, as an experiment, several small lakes in Lewis and Franklin counties were stocked for the first time with yearling, brown and rainbow trout, and during the past summer I had the pleasure of seeing many specimens of the same weighing from one-half to one and one-half pounds each.

Mr. F. W. Chase, of the Loon Lake Hotel Company, located at Loon Lake, Franklin county, writes me that Loon lake did not contain lake trout prior to 1879, when he obtained from the State an allotment of lake trout fry for that lake, and that plants have been continued nearly every year since, and that at the present time lake trout are very plentiful in Loon lake. He also says "that brook trout were very scarce in that section years ago, but by liberal planting of fry and fingerlings the fishing has been greatly improved." He says that "lake trout of eleven and three-quarters pounds weight and brook trout of four and three-quarters pounds have been caught, all due to the planting of State fish."

For another example of what the artificial propagation of fish can accomplish, I must cite a small lake in Franklin county, about one and one-half miles in length, that did not contain a whitefish in 1894, but during the winter of 1894–95 about 500,000 whitefish eggs were hatched at the Adirondack hatchery and planted in this lake. The matter was almost forgotten until the fall of 1897, when a few small

specimens supposed to be whitefish were accidentally caught by the State hatchery employes, and at my request were sent to Dr. Tarleton H. Bean for identification. The doctor pronounced them whitefish. This fall I directed that at about the whitefish spawning season a net should be set for them, which resulted in the capture of about 12,000 whitefish averaging nearly two pounds each, from which almost 18,000,000 eggs were obtained. These eggs are now in process of hatching at your Adirondack, Caledonia and Oneida hatcheries. Only about seventy-five of these whitefish were injured by handling. The balance were all returned to the lake, and I hope that with proper management the take of eggs from this lake will be doubled next year.

During the past year whitefish eggs were also obtained from Canandaigua and Hemlock lakes, and were hatched at the Caledonia and Oneida hatcheries. The fry were largely planted in Canandaigua, Hemlock and Ontario lakes. By artificial propagation Lake Ontario can again be made to furnish plenty of whitefish, but to insure this, the greatest care must be taken to protect the present stock found in Canandaigua, Hemlock and Little Clear lakes, as they are the only waters wholly under the jurisdiction of the State from which whitefish eggs can be obtained in paying quantities.

The past summer was remarkable for the long-continued drought, and before the fall rains came, many small streams went lower than ever before known and many fish died for lack of water. On this account it is safe to say that the demands on your Commission for the next season's output will largely increase, and I intend that the hatcheries shall be prepared to meet it. On account of this drought it was found necessary to provide means to obtain more water at some of the hatcheries, and several improvements on this line were made at the Adirondack and Caledonia establishments. At the former hatchery the work was finished and it permanently places the capacity and standing of that hatchery in the front rank of the kind in the country.

Special mention of the work of propagation of both fish and game birds at the Pleasant Valley hatchery must not be omitted. By consulting my report as to the output from each hatchery, you will see that Pleasant Valley stands second in the list for the propagation of fingerling and yearling trout.

At present this hatchery is the only one where attention is paid to the breeding or rearing of the Mongolian or ring-necked pheasants. From a very small beginning of only twelve birds in 1897, the stock has rapidly increased, requiring more coops or inclosures each season, until over 400 birds were successfully reared the past year. A suitable appropriation is required to enlarge the breeding inclosures and carry on

the work. With this available, several hundred pheasants can be liberated by your Commission during the year 1900, and also allow for the retaining of stock enough to duplicate the output each year.

One very important matter has often been alluded to in the annual report of your Commission, namely, the necessity of a law that will permit the Fish Commission of the State to stop all fishing on small trout brooks for a period of from two to three years, when in their opinion the requirements demand such action; but if such a law covering all sections of the State should be considered unwise or too sweeping, then I would suggest it for small brooks that may be located on State lands.

The following is a record of the distribution from each hatchery, and the total summary of all for the year ending September 30, 1899.

Yours respectfully,

J. ANNIN, JR.,

Superintendent of Hatcheries.

Distribution of Fish from each Hatchery.

Adirondack Hatchery.

Brook trout fry,	550,000
Brook trout fingerlings,	39,700
Brook trout yearlings,	2,200
Brown trout fry,	205,000
Rainbow trout fry,	48,000
Lake trout fry,	225,000
Frost fish fry,	2,850,000

Beaverkill Hatchery.

Brook trout fry,	486,000
Brown trout fry,	54,000

Caledonia Hatchery.

Brook trout fry,	491,000
Brook trout fingerlings,	23,000
Brook trout yearlings,	10,150
Brown trout fry,	579,000

Brown trout fingerlings,	78,266
Brown trout yearlings,	28,146
Rainbow trout fry,	2,000
Rainbow trout fingerlings,	119,200
Rainbow trout yearlings,	47,066
Lake trout fry,	42,000
Lake trout fingerlings,	387,650
Lake trout yearlings,	39,813
Two to five-year-old brook trout,	22
Two to ten-year-old brown trout,	21
One and one-half-year-old brown trout,	200
Two-year-old brown trout,	25
Two-year-old rainbow trout,	50
Two to five-year-old rainbow trout,	18
Red-throat trout fingerlings,	26,500
Red-throat trout yearlings,	50,973
Four-year-old red-throat trout,	8
Red-throat trout eggs,	20,000
Pike-perch fry,	7,300,000
Shrimp,	115,000
Whitefish fry,	19,425,000

Clayton Hatchery.

Large-mouth black bass fry,	132,500

Chautauqua Lake Hatchery.

Muscalonge fry,	4,860,000

Cold Spring Hatchery.

Brook trout fry,	1,273,000
Brook trout fingerlings,	18,850
Brook trout yearlings,	49,960
Brown trout fry,	30,000
Brown trout fingerlings,	10,150
Brown trout yearlings,	6,450
Rainbow trout fry,	13,000
Rainbow trout fingerlings,	18,800
Rainbow trout yearlings,	22,200
Tom cod fry,	38,000,000
Smelt fry,	1,500,000
Lobsters,	2,028,000

Catskill Hatchery.

Herring fry,	1,000,000
Shad fry,	1,748,800
Shad fry (donated to State waters by the U. S. Fish Commission from U. S. steamer *Fish Hawk*),	2,500,000
Shad fry (from Hatchery Station at Havre de Grace, Md.),	9,500,000
Shad fry (hatched by State at Smithtown river),	565,000

Fulton Chain Hatchery.

Brook trout fry,	551,000
Brook trout fingerlings,	23,000
Brown trout fry,	125,000
Lake trout fry,	180,000
Lake trout fingerlings,	17,000
Frostfish fry,	3,025,000

Oneida Hatchery.

Bullhead fry,	4,000
Bullhead yearlings,	1,500
Yearling and adult pickerel,	70
Pike-perch fry,	37,975,000
Yearling pike-perch,	600
Small-mouth bass yearlings,	500
Yellow perch yearlings,	12,700
Whitefish fry,	8,250,000

Pleasant Valley Hatchery.

Brook trout fry,	374,000
Brook trout fingerlings,	71,200
Brook trout yearlings,	2,700
Brown trout fry,	310,000
Brown trout fingerlings,	111,800
Brown trout yearlings,	24,900
Rainbow trout fry,	25,000
Rainbow trout fingerlings,	81,150
Rainbow trout yearlings,	59,500
Lake trout fingerlings,	37,875
Three-year-old brown trout,	6
Three-year-old rainbow trout,	6
Red-throat trout fingerlings,	5,300
Red-throat trout yearlings,	17,500

Sacandaga Hatchery.

Brook trout fry,	490,000
Five to seven-year-old brook trout,	275
Brown trout fry,	70,000
Lake trout fry,	75,000
Frostfish fry,	1,725,000

From the Hudson River.

Adult large-mouth black bass,	875
Adult yellow perch,	36

From Hemlock Lake.

Adult pike-perch,	48

From Canandaigua Lake.

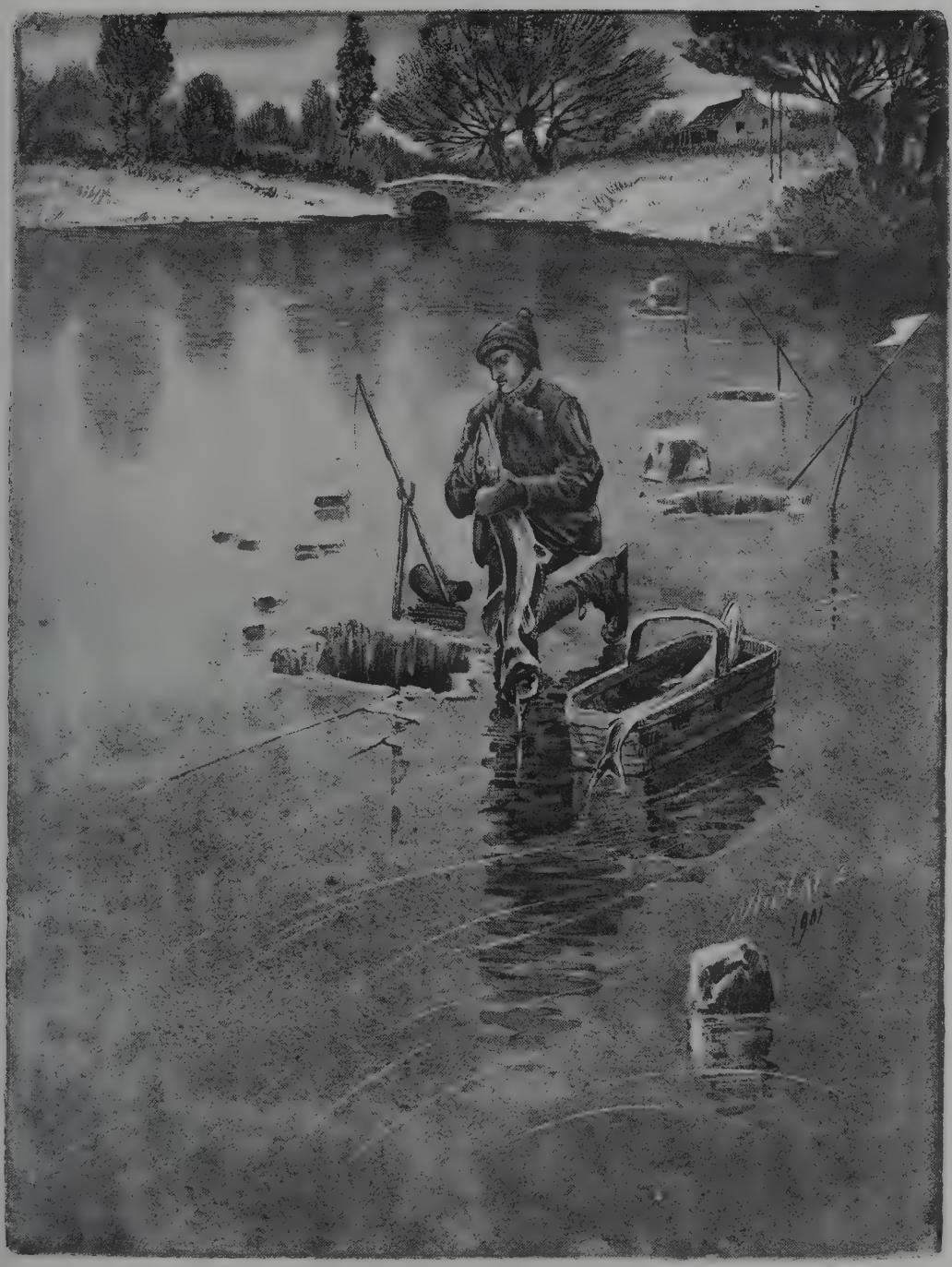
Adult pickerel,	64
Adult pike-perch,	41
Adult small-mouth black bass,	6

Total Summary of Fish Planted.

KIND.	Year ending September 1898.	Year ending September 1899.	Gain for 1899.	Loss for 1899.
Brook trout fry,	3,964,500	4,215,000	250,000	
Brook trout fingerlings,	72,785	175,750	102,965	
Brook trout yearlings and older,	20,762	65,307	44,545	
Brown trout fry,	857,000	1,373,000	516,000	
Brown trout fingerlings,	34,640	200,216	165,576	
Brown trout yearlings and older,	69,103	59,748		9,355
Rainbow trout fry,	119,000	88,000		31,000
Rainbow trout fingerlings,	13,500	219,150	185,650	
Rainbow trout yearlings and older,	35,760	128,840	93,080	
Lake trout fry,	762,000	522,000		240,000

TOTAL SUMMARY OF FISH PLANTED — (*Continued*).

KIND.	Year ending September 1898.	Year ending September 1899.	Gain for 1899.	Loss for 1899.
Lake trout fingerlings,	133,725	442,525	308,800	
Lake trout yearlings,	18,786	39,813	21,027	
Red-throat trout eggs,	- - -	20,000	20,000	
Red-throat trout fingerlings,	1,000	31,800	30,800	
Red-throat trout yearlings and older,	- - -	68,481	68,481	
Pike-perch fry,	17,550,250	45,275,000	27,724,750	
Pike-perch yearlings and older,	222	689	467	
Bass,	116,450	133,881	17,431	
Pickerel,	50	134	84	
Tom cod,	48,000,000	38,000,000	- - -	10,000,000
Smelt,	48,000,000	1,500,000	- -	46,500,000
Herring,	1,500,000	1,000,000	- - -	500,000
Lobsters,	6,550,000	2,028,000	- -	4,522,000
Frostfish,	5,785,000	7,600,000	1,815,000	
Muscalonge,	2,650,000	4,860,000	2,210,000	
Shad,	10,897,400	14,313,800	3,416,400	
Shrimp,	65,000	15,000	- - -	500,000
Yellow perch,	2,562,800	12,736	- -	2,550,064
Whitefish,	24,100,000	27,675,000	3,575,000	
Bullheads,	- - -	5,500	5,500	
Ciscoe,	15,000,000	- - -	- - -	15,000,000
Total,	188,899,733	150,069,370		



TIPTILTS FOR PICKEREL.

Report of Chief Fish and Game Protector and Forester.

To the Commissioners of Fisheries, Game and Forests:

GENTLEMEN.—I take pleasure in presenting to your honorable Board the results accomplished by the force of fish and game protectors and foresters under my supervision during the fiscal year ending September 30, 1899.

The following devices, which were being illegally used for the taking of fish, were captured and destroyed:

Fyke nets,	577
Trap nets,	192
Gill nets,	397
Squat nets,	93
Seines,	39
Pound nets,	3
Set lines,	288
Spears,	7
Tip-ups,	102
Eel-weirs,	10
	1,708

Total number of nets and other illegal devices destroyed were 1,708, valued at $17,168.

Three hundred and twenty-eight persons were prosecuted during the year for violations of the Fisheries, Game and Forest Law, resulting in the conviction or judgments against 305. The remaining twenty-three persons were either discharged by court or acquitted by jury. The total amount of penalties, costs and fines imposed was $9,539.28, of which $8,148.47 has been collected and turned over to the Comptroller as the law provides. The remaining $1,390.81 was disbursed to attorneys, justices and constables in cases where recovery was had. Their fees were deducted before remitting to the Department. There were also fines imposed to the amount of $490 where no recovery was had, with result that the persons fined

served time in jail at the rate of one day for every dollar, amounting to 490 days served.

This Department has every reason for congratulation upon the results achieved during the past year, especially in the percentage of convictions, which demonstrates that public sentiment is increasing in favor of forest, game and fish protection and the enforcement of the laws governing the same. The number of protectors and foresters is insufficient in certain localities to successfully enforce the laws. This is particularly true of the Adirondacks, where at least eight more protectors and foresters could be advantageously employed, and two on the east side of the Hudson river, between Saratoga and Long Island sound, a distance of about 150 miles, where there are many small lakes and streams abounding in fish, together with the Hudson river, where more protection is required. Also the large tracts of second-growth timber and swamps, where game birds are very plentiful, and the only protection given this last-named section is by protectors from other localities, who are sent there at considerable expense, and as a protector's expense account is limited by law and is quite insufficient for his *own* locality, he is not in a position to cover a large territory.

I wish to make special mention of the Anti-hounding Law and its excellent result as a protective measure. I can assure the public that this law, which has only been in force three years, has resulted in at least fifty per cent. increase of deer in the Adirondacks. It is growing in favor every year, and should remain permanently on the statute books. While I do not pretend that this law is not violated (for that would not be believed by any one, as all laws on our statute books are violated at all times), I will emphatically assert that there is not one-tenth the number of violations that some would like to make us believe.

It is with pleasure that I allude in this report to the generous co-operation of the Chief Executive of the State for the interest he has taken thus far in legislation affecting this Department, and his desire that all laws for the protection of forests, fish and game be rigidly enforced. It was a pleasure during the session of the last Legislature to know that the Executive of the State was cognizant of and interesting himself in all legislation relating to forests, fish and game, not only for the rod and reel, but for the market fisherman, who, unless specially provided for by the Legislature, would allow his greed to exterminate everything before him. One measure which became a law during the past year, viz., the power of search or examination given protectors, where they have cause to believe that fish or game are concealed in violation of law, has done more during the past summer to deter violations than any law heretofore enacted, and without hardship to any person.

This measure had been twice unanimously passed by both branches of the Legislature prior to 1899, but through some unaccountable reason had failed to become a law.

While it is not advisable to change the law too often, thereby confusing the public, some few changes should be made which are of no little importance. The first relates to the system of firewardens and the law relative to the bringing of actions for setting fires on waste or forest lands. Second, to return to the Laws of 1885, chapter 242, which relates to the use of nets and where they cannot be possessed lawfully. Third, section 3 of chapter 577, Laws of 1883, which provides where actions may be brought and maintained. Fourth, there is no protection under the present law on sturgeon, either as to close season or size of the fish, which has resulted in nearly exterminating them in the Hudson and St. Lawrence rivers. Persons fishing in the Hudson river and Lake Ontario with nets, where the law permits the use of nets continually, do not return to the water the small sturgeon, but ship them with other coarse fish at a small price, when if they were allowed to grow to a certain size they would become very valuable, and are at the present time bringing a better price than any food fish on our market. If there was a limit placed on the size, say three and one-half to four feet in length, it no doubt would answer the purpose without a close season.

These points are well worth considering by the Legislature, and if they would go farther, not in the way of changing the open or close season on any species of fish or game, but by a general codifying, condensing and simplifying of the present laws, less confusion and trouble would be experienced in their interpretation.

I am informed that Senator Brown, the present chairman of the fish and game committee in the Senate, on account of a long experience as an attorney in prosecuting under the Game Code, and knowing full well, as he must, the confused condition the law is in, has gone over the present law with a view of codifying and condensing it. I would most emphatically urge that the Legislature consider a measure of this kind should it come before them.

All of which is respectfully submitted,

J. WARREN POND,

Chief Fish and Game Protector and Forester.

Special Report of Superintendent of Forests.

ALBANY, N. Y., *December* 6, 1899.

To the Fisheries, Game and Forest Commission, Albany, N. Y.:

GENTLEMEN.—In compliance with a request from your honorable Board I respectfully submit here some suggestions as to an increase in the working force of the Forestry Department in order to secure better results in the care and management of the Preserve, and greater efficiency in the protection of our forest areas, both public and private.

First of all, because of its importance and necessity, I would respectfully renew the recommendation which I made in a preliminary report of the Commission, transmitted to the Legislature, January 20, 1899, which was as follows:

"Although, in the management of the Forest Preserve the last year, the forest fires have been less in number and in area than at any like period since the establishment of the Forestry Department, I believe that the damage from this source can, under proper arrangement, be still further minimized, and, perhaps, entirely prevented. To this end a more compact and systematic organization of the corps of firewardens is necessary. The various duties of the Superintendent of Forests will not permit him to give the attention to this branch of the service which he would like, and which the safety of the forest demands. He suggests the appointment of an assistant who shall be designated as the supervisor of firewardens, or chief fire-warden, and whose time and services shall be devoted exclusively to the proper organization, supervision and direction of the firewardens, of whom there are 187 in the forest towns, not including the district wardens; or over 700, including the latter. This official, in the course of his duties, would have the opportunity of visiting the place where each fire occurred, and making a proper examination as to its cause, extent and damage, and to institute whatever prosecution might be necessary for a violation of the Fire Law. He should see that in each case the warden fills out his blank report, and that it states all the facts connected with the fire. He should scrutinize the bill of each warden for the services of the posse ordered out, and see that the number of men charged for and other items are correct. He should have

supervision of the bills rendered by the various towns against the State in reimbursement for half of the expenses paid by them for the extinction of forest fires, as now provided by law. By careful attention to the latter requirement, a competent official would save to the State a sum more than double his salary. Furthermore, in fulfillment of the requirements of the law, he should see that whenever a vacancy occurs in the list of firewardens that the place should be promptly filled by recommending some person who has not only had experience in fighting fire, but, also, one who will command the respect and obedience of a posse of fellow citizens when it is necessary to order them out to fight fire. In further compliance with the requirements of the Fire Law, he should see that every forest town is properly divided into small districts, and a district firewarden, properly located, appointed in each. During his spare time, while at the Albany office, he should prepare maps of each town showing the subdivision into fire districts. He should, also, attend to the distribution among the firewardens of the printed notices containing the rules and regulations of the Forestry Department in relation to the prevention and extinction of forest fires, and should see that these notices are thoroughly and properly posted throughout the woodland districts of the Adirondacks and Catskills.

"During the winter, when not busy in adjusting the annual accounts, he should spend his time in traveling about through the various towns, visiting each firewarden and district firewarden in order to see that everything is fully organized and ready for fighting the spring fires."

In this connection I would again urge that the surest way to decrease the number of forest fires is through the prompt and vigorous prosecution of the persons to whose criminal carelessness so many fires are due. When, in each locality, some of these offenders have been fined or jailed, then the fires from such causes will cease, and not until then. A chief firewarden, if appointed, would follow up each fire and ascertain the cause. If it started through carelessness or willful neglect in burning fallows or abandoned camp fires, he would institute the necessary legal proceedings. As it is now, the firewardens are afraid to report the cause of the fires in their district. Too often, through fear of their neighbors, they report "Cause unknown." There should be no difficulty in ascertaining where a fire started; and it requires but little effort or intelligence to ascertain the cause.

In short, a regiment might as well be sent into service without an officer, as to expect that the large force of firewardens can attain any degree of proper efficiency without some directing head.

If through the necessary legislation the Superintendent can be provided with an assistant, who, under his direction, will devote his time wholly to the supervision of

the firewardens and prosecutions of violations of the law, I am confident that the forest fires in our State can be reduced to the lowest possible minimum.

I would embrace this opportunity also to call attention to the urgent need of some efficient system for patrolling the Adirondack and Catskill forests. To this end I would suggest the organization of an adequate force of forest rangers who should be assigned to districts of a suitable area, which should be patrolled constantly and thoroughly. The few game protectors on duty in the Adirondacks cannot attend to this kind of work. One man cannot patrol an entire county.

The value of patrol service was strikingly exemplified this last summer, at the time of the numerous fires which, owing to an extraordinary drought, occurred then. Although one-third of the Adirondack forest is owned or controlled by private clubs, or held as private preserves, not one fire occurred on these lands, because this territory was thoroughly and efficiently guarded. On the million acres, or thereabouts, owned by the private preserves there are about ninety-eight patrols. Surely the State with its greater acreage should have some such kind of a force, even if not so numerous.

Each ranger or patrol should be assigned to some particular township for his district. The average Adirondack township is about seven miles square. The ranger should be required to live on the township, and a log cabin should be built for that purpose near the center of the township. He should live in the woods, not in some distant village. During dry seasons the highways should also be patrolled because more fires start at a roadside than anywhere else.

The duties of a patrol are different from those of a firewarden. The firewarden's work commences *after* the fire has started; the work of the patrol, *before*. The best way to fight fire is to have no fire; and there will be very few fires in woods that are thoroughly watched. The patrol would follow each camping party, and all hunters or fishermen, to see that the "coffee fires" are extinguished; and he would keep a sharp watch on any skulker who might be a possible incendiary. In winter time he would see that no timber was stolen and hauled off from State land; also that no deer were killed by "crusting." Every snowshoe track would be followed, and the reason for it ascertained.

The rangers or patrols by their mere presence in the woods would contribute greatly to the protection of fish and game. No poacher would attempt to operate on a township where there was a ranger. These rangers would also report all violations of the Game Law, and these reports would be turned over to the Chief Fish and Game Protector for prosecution. This force of rangers, if numerous enough, should be under the charge of some official who, in addition to other field work, should see

that each man was always on his district and attending to his duties. Such official could be designated as the assistant superintendent or as an inspector.

In the way of further suggestion I would respectfully call attention to the constant need of statistics and information relating to the acreage and classification of the woodlands in the Preserve, and in the Adirondack Park as well. It is difficult to understand the real forestry situation in Northern New York without having some tabulated figures which will show not only the acreage, but also the amount of virgin forest, lumbered land, burned or waste areas, and water surfaces, lot by lot and town by town. No correct estimate can be formed of our forest resources or future timber supply until the remaining area of virgin forest is accurately determined. About eleven years ago I made a careful tabulation of figures showing these facts, based on information gathered from the assessment-rolls, in which each lot is fairly well described; but the forest has changed so much under the lumbering operations of the past ten years, combined with the great development in the wood-pulp industry, that the figures have ceased to be of much value.

Moreover, the land list or schedule of lots in the Forest Preserve, which forms the basis of our entire work, should be compiled annually instead of at long intervals. In order that the statistics relating to these various matters and to the annual output of the mills may be prepared and furnished for the information of all concerned, it seems advisable that some provision should be made for the appointment of a clerk who should have charge of the land and tax records. He should also have some skill in drafting in order to prepare and care for the many maps which are in daily use in the course of the office work. The 1,200,000 acres of forest land owned by the State involves a large amount of real estate work, as well as forestry. The question of taxes and titles is no small one, and the Superintendent should have some clerk to attend to it. If an individual or a corporation owned a vast estate like the Forest Preserve, there would not only be one clerk but many employed to look after the records pertaining to so much real estate. The Forestry Department at Washington, without any land under its charge, employs twenty or more clerks on forest statistics.

As a further recommendation I would respectfully suggest the advisability of the Commission doing something in the line of scientific, practical forestry. Although the forestry clause in the new Constitution prohibits the cutting of any timber, there yet remains the important work of reforesting burned or denuded areas, work which can be undertaken and carried on successfully without violating any of the constitutional provisions. From five to ten men under the direction of a competent forester might be employed to advantage in replanting some of the

waste areas of which there are many thousands of acres in the Preserve. It is no answer to this proposition to say that these lands will reforest themselves naturally. True, nature will do this work unaided. But will it reforest the ground with valuable merchantable timber? In forestry, as in farming, the work of nature must be guided and assisted.

If the Legislature will make the necessary provision, there should be an annual appropriation for the care and maintenance of the Forest Preserve, and for the protection of the Adirondack and Catskill forests. This sum should provide for the pay of the superintendent, assistant superintendent, and thirty-five rangers; also for a chief firewarden and a land clerk.

These suggestions are based on a lifelong experience in forestry work, the last fifteen years of which have been spent in the Adirondack and Catskill woods, where, in addition to my other duties in connection with the Preserve, I have made a careful, thoughtful study of this entire question.

In conclusion, I want to thank your honorable Board for the opportunity afforded me of making these suggestions. I trust that some of them, if not all, will meet with your approval, and that the Legislature and Governor will provide the necessary means for carrying them into effect.

All of which is respectfully submitted,

WILLIAM F. FOX,

Superintendent State Forests.

Memorandum.

As a tentative proposition I would name the following tracts or townships as suitable areas to each of which a ranger should be assigned for patrol duty:

Townships 1 and 2, 3, 4 and 5, 6, 8, 10 and 29, 11 and 13, 14 and 25, 15, 16, 21, 22 and 50, 26 and 27, 30, 31, 32, 40, 41, 42 and 5, 43, 49 and W. R. Patent of the Totten and Crossfield Purchase.

Townships 11 and 12 of the Old Military Tract.

Townships 18, 20 and 24, Macomb's Purchase.

Benson Township, Arthurboro Patent, Nobleboro Patent, Lawrence Patent, Oxbow Tract, Palmer's Purchase and Adgate Tract.

Townships 9 and 10 (one district), Moose River Tract. W. F. F.

Report of the Superintendent of Forests.

ALBANY, N. Y., *January* 2, 1900.

To the Fisheries, Game and Forest Commission:

GENTLEMEN.— I would respectfully submit for the consideration of your Honorable Board, in making the usual preliminary report to the Legislature, a brief statement of the work accomplished during the past year so far as it relates to the Forestry Department, passing by certain details that are reserved for the supplementary report which will be issued at a later date.

Although the lands of the Forest Preserve are scattered over an area of 15,000 square miles in the Adirondack and Catskill counties, all attempts at timber cutting on State property, whether intentional or otherwise, have been promptly checked before the depredations attained any considerable extent. In some of these cases the trespassers claimed ownership of the land, disputing the validity of the tax sale through which the title had passed from them to the State. In one case where a party had gathered fallen and dead timber for firewood, it was found that live timber had been taken also. In a few instances the axemen of lumber or wood pulp companies had, carelessly or intentionally, cut beyond the line of blazed trees that marked the boundary of a State lot. But in most places the depredations were the work of timber thieves who watch their opportunity to cut and haul a load of logs off from a State lot whenever they think it can be done without detection. There were twenty-one cases of trespass on the Preserve during the past year, each of which was promptly prosecuted and a conviction obtained. Some of the parties pleaded guilty and paid their fine, and one man was sentenced to imprisonment. The full penalty prescribed by law was imposed and paid in most of the suits, except the one in which the defendant was sent to jail.

After deducting the costs of the various suits, the State received, in the aggregate, the sum of $1,196.09, the penalties ranging from $7 to $460. The amount received was further increased to $3,323.97 by payments made in settlement of penalties imposed under prosecutions brought during the previous year. In addition to the twenty-one cases of timber stealing mentioned, there were twelve others in which suits had been commenced, but which as yet have not been brought to trial.

The counties in which these trespasses occurred and the number in each county

were; Fulton, 9; Essex, 9; Hamilton, 8; Oneida, 6; Ulster, 1. Most of these depredations were committed on the scattered, isolated lots that are situated outside of the Adirondack Park, and which by reason of their location afford better facilities for small timber thefts. The actual stumpage value of all the timber cut during the past year on the Preserve by trespassers is small as compared with the amount of the fines collected.

There being no provision for the employment of forest patrols or rangers to watch the lands in the Preserve, the work of guarding the State forests necessarily devolves on the Fish and Game Protectors, who, despite the small number on duty in the Adirondack and Catskill forests, have shown commendable efficiency in stopping the work of the timber thieves. While on this matter I would take the opportunity for commending to the favorable notice of your Board the valuable services rendered by Mr. J. W. Pond, the Chief Fish and Game Protector, and the Assistant Chief, Mr. John E. Leavitt. By their active, intelligent work they have contributed largely to the suppression of the marauders whose operations in former years were carried on to such an alarming extent.

Some of the trespasses on the State lands were committed for the sole purpose of obtaining firewood; but, in each case of this kind, the people who did the cutting were arrested, convicted and fined. These parties, all of whom were very poor, pleaded in their defense that the State owned all the land in their vicinity, except some small private preserves whose owners would not sell them any timber for fuel. They claimed that they had gathered all the dead or fallen timber for a long distance, and that to go farther for such fuel made it cost more than firewood of any kind was worth. They complained loudly of the worthless quality of the old, fallen trees, which they dislike to burn, accustomed as they have been all their lives to using good "body wood" in their cook stoves.

The following letter is a sample of many that are received:

PISECO, N. Y., *December* 13, 1899.

DEAR SIR.— I have been informed by one of the officers of your Commission that the people of this vicinity are forbidden to cut any firewood on State lands. I write you for advice whether or not we have a right to cut what cordwood we need to burn during the winter months. As a good many of the people here have no woodland of their own and cannot buy any of their neighbors, it becomes quite necessary for them to cut what wood they want to burn — which does not exceed twenty-five cords for each family for a whole year — on the State.

All the woods used as firewood are hard woods, no evergreen timber being used. This cutting wood makes but very little difference in the appearance of the forest,

which becomes in a few years more heavily timbered than ever by young trees growing up.

If we have no right to get our wood off the State land, please inform us what we can buy the timber for per acre. Truly yours,

WILLIAM DUNHAM.

The action of the State officials in refusing to allow families in many localities to obtain fuel has occasioned unfriendly criticism and aroused a feeling of bitter resentment among the settlers in some localities. But the Forestry Law prevents the Commission from exercising any discretion in the matter. The law states explicitly that no timber on the Forest Preserve shall be sold; and there can be no modification of this restriction, for it was inserted in the State Constitution.

It has been suggested that the inability of these people to procure fuel will tend to drive them out of the woods; that the squatters on State land will thus be forced to vacate the premises without any resort on the part of the State to arbitrary measures in the way of ejectment writs; that temporary campers as well, the hunters and fishermen who almost invariably cut live timber for their roaring camp fires, would be kept out, and that such results would be highly desirable. But, on the other hand, it must be remembered that the State is dependent on the resident population, scattered through the forests, for timely help in fighting fires. The posse warned out by a firewarden in time of danger is drawn mostly from this very class.

It may be well here to mention, also, the numerous applications to purchase the fallen timber remaining on the ground after a forest fire. For instance, a fire occurred last August on Black Bear mountain, near the Seventh lake on the Fulton chain, on land owned by the State. About 400 acres of forest were burned over. Some of the timber was consumed by the flames; but a large number of trees which fell were only slightly charred, and were available for merchantable purposes. In addition there was a remarkably large amount of the fallen timber which was wholly uninjured or scorched, the trees having fallen because, after the flames were under control and the adjoining ground well trenched, the fire continued to burrow in the ground, where, by eating its way from place to place, it burned off the roots of the trees, large and small, causing them to fall from their own weight or the pressure of passing winds. The thick leaf mold, or "duff," which underlaid the forest, combined with the exceptional drought at that time, conduced materially to this result, until every tree within the area adjoining the trenches fell to the ground in a tangled, unburned mass.

Mr. Fred. Hess, the well-known guide and hotel man of that region, made a written application for the purchase of this fallen timber, offering $600 for the trees as they lay on the ground. There were other applicants, also, some of whom intimated that they would pay still more.

An intelligent forest management would require that this mass of fallen timber, limbs and tops should be removed in order to protect the surrounding woods from the effects of the second burning, which is so apt to occur in a "slash" of this kind after it becomes dry and seasoned. If a fire starts in this mass of down timber at any time after the next season it will burn like a furnace, the extreme heat preventing any one from approaching it and rendering it uncontrollable.

To decline the offer made for the timber results in a direct loss to the State of just so much money. The flippant remark is sometimes heard that the State does not need the money. Granted, but that fact does not warrant any waste of resources any more than a neglect to collect taxes. If the State does not need the money, the proceeds could be well expended in clearing up the ground to insure safety from further burning and to enable it to properly reforest itself. And this would be done if the land were owned by an individual instead of the State.

But the forestry clause of the Constitution allows no latitude or liberal construction in interpreting its mandates. It says plainly that no timber on the Forest Preserve shall be "sold or removed." Until there is some competent judicial opinion to the contrary it is incumbent on the Department to construe this clause literally and abide by it accordingly.

This matter is discussed here at some length in order to give some idea of the questions which arise in connection with the care and custody of the Forest Preserve.

The forest fires in 1898 were not all reported in time for the last preliminary report to the Legislature. Since then the reports of the firewardens have been tabulated, from which it appears that in the year 1898 the various burned areas amounted in the aggregate to 9,644 acres, of which 669 acres belonged to the State. The aggregate of losses, as taken from the different reports, were $7,495. As the damage seems small compared with the acreage, it may be well to explain that a large part of these fires occurred on barren, waste lands that have been burned over before, or denuded by other causes. There was no timber, and the ground was covered with only a sparse growth of bushes, shrubs and ferns, with here and there some small poplars or bird cherries. In such places the loss is only a prospective one, it being confined to the prevention of future growth instead of any actual loss of standing timber.

Of the ninety-eight fires reported in 1898, the causes, so far as stated, were as follows:

From clearing land	18
From railroad locomotives	16
From fishermen	3
From hunters	3
From incendiaries	3
From railroad section men	1

The cause in the remainder of the cases was reported as "unknown." Three-fourths of them were probably due to carelessness in burning fallows which adjoined some piece of woods.

The failure of the firewardens, in so many of their reports, to state the cause of the fire was evidently due to their reluctance to inform on their neighbors. Too often these officials did not want to ascertain the cause. I have already discussed in a special report the necessity for the appointment of some chief firewarden who, in the course of his duties, would follow up each fire, ascertain the cause, and institute prosecutions for each violation of the fire law.

Although the firewardens receive no salary — being paid only for their actual time while at a fire — they have as a whole displayed commendable activity and zeal in the discharge of their duties. Some of them were particularly active in enforcing the law prohibiting fallow fires in certain specified months, and successfully prosecuted several parties who were guilty of a violation of this clause in the forestry law. Of the firewardens entitled to favorable mention in this report, special credit is due to Mr. H. B. Linstruth, of the town of Croghan, Lewis county, and Mr. Willard Marsh, of Big Indian, Ulster county.

The Fish and Game Protectors, also, rendered good service in the prosecution and punishment of persons who were guilty of carelessness in burning brush or leaving camp fires unattended. Protectors D. H. McKinnon of Delaware county, F. S. Beede of Essex and G. W. Earl of Lewis, are particularly deserving of credit for their activity in prosecuting and convicting parties who were guilty of criminal neglect in the use of fires.

The fires referred to in the foregoing paragraphs occurred in 1898. Fuller details, with the usual tabulation of dates, localities, damages and causes, will appear in the supplementary report for that year, which is now in the hands of the printer.

The season just passed, that of 1899, was marked by the largest number of fires that have occurred at any one time during a long term of years. Hitherto, forest

fires in our State have, for the most part, occurred in the spring months; a very few happen in the fall; but forest fires in the summer, when the trees are in full leaf, were almost unknown.

The spring months last year passed by with very little damage from woodland fires. Several were reported by the firewardens, but, as they were quickly extinguished, or small in area, the losses were merely nominal. When the spring had passed, and with it the time of danger, the department officials congratulated themselves on the fact that there had been so little loss from fire, and were prepared to claim some credit for an improved condition of affairs.

But, with the summer months, there came a season of unprecedented drought. There was no rainfall aside from the scanty showers which happened only at long intervals. The water in the swamps disappeared. Springs and streams ran dry that were never known to fail. Trout brooks which had been stocked at considerable expense dried up, and the fish in them were killed. In some of these little streams not a drop remained to moisten the bare, rocky bed over which, in spring, the water foamed and eddied in its noisy course. In the field and barrens that skirted the woods, the grasses and ferns were withered, while on shrubs and bushes the leaves, which in midsummer should be broad and green, were dry, curled and dusty. Even in thick forests, the favoring shade failed to keep the duff and leaf mold on the ground from becoming dry and tinder-like. As the drought continued, with no sign of rain, old woodsmen shook their heads gravely as they prophesied danger, and the firewardens watched with anxious outlook for the rising smoke which, sooner or later, would announce a forest fire.

On Monday, August 7th, the first fire, or fires, broke out in the vicinity of Indian Lake. I happened to be there at the time, attending to some matters in connection with the flow line of the new Indian lake reservoir. Four fires started in different localities at about the same time. The largest one was on the range of hills east of the village, on Township 17. Another started on Township 32, on the side of the mountain east of Indian lake. The smoke from another was rising in the direction of Cedar river, on Township 33. Men were at work at each fire, some of them having been hired by the lumber company which owned the adjoining timber.

Two of these fires were started by lightning. I am aware that doubt has been expressed as to fires starting from such a cause. Lightning striking in the forest is so common an occurrence that the splintered shafts of the trees attract little attention; nor is there any fire expected from such causes, for the heavy downpour accompanying a thunder storm extinguishes the flames. But in each of these cases

the lightning was seen to strike on a side hill, after which fire sprang up immediately on the same spot, where no smoke had been seen before.

During the drought of last summer the electric storms were accompanied by so little rain that a dry shrub or resinous tree, when struck by lightning, would hold the fire until the shower passed and then burn freely. The reports of the firewardens for this last season describe many instances where the cause of the fire is attributed to lightning, and in seven of these cases the proof adduced was convincing. I might cite also a case which several years ago came under my observation, where a dead stub was ignited by lightning striking near the summit of Buck mountain at Long Lake.

When these fires broke out at Indian Lake the town firewarden, who is a guide, was absent with a fishing or camping party, and did not return to take charge of the work. I accordingly authorized Mr. Robert B. Nichols, a resident of the town, to act as firewarden, an arrangement which was subsequently sanctioned by your Board in his permanent appointment.

Feeling apprehensive of fires elsewhere I went to the Saranac region. On Sunday, August 13th, a brush fire started on Township 21, which adjoins the beautiful tract of State forest on Township 20, the Upper Saranac township. I went to the place and skirted the fire in different directions to ascertain the extent of the danger. Finding no one at work fighting it, I drove to the house of the nearest firewarden, and succeeded in getting him to take charge of it, while in the meantime I telegraphed to Saranac Lake village for men.

On the following day, August 14th, while crossing Little Green pond, my attention was called to a large, dense cloud of smoke rising in the southeast. The fire seemed to be on Township 20. Going ashore I walked to Saranac Inn, but when I reached there the fire appeared as distant as before I started. Taking a horse and buckboard I drove through the woods on the west side of the Upper Saranac Lake, and then, finding no signs of fire, drove on to Floodwood Pond. On arriving there the fire was still in the distance. I then concluded it must be at Tupper Lake Junction; and, on returning to Saranac Inn station, ascertained by telegraph that such was the case. This proved to be one of the largest fires of the season, as to area, but there was no loss in timber. The ground burned over was almost entirely waste land and swamp. Yet there was enough scrub growth on it to make a hot fire in places, and it was only by great exertion that the sawmills and lumber yards at the junction were saved.

While at Tupper Lake a heavy column of smoke rising in the west showed that an extensive fire was raging on the mountains in that direction. On inquiry, it was

learned that this fire was on Oakham Township in St. Lawrence county, about eleven miles away. As there are no people living in that vicinity, I telegraphed to Mr. Emery P. Gale, a firewarden residing near Childwold Park, to warn out a party to go there. Mr. Charles H. Sisson, of the Sherman Lumber Co., Tupper Lake, kindly volunteered to go over to Oakham and ascertain for me the location and extent of the fire, concerning which I was unable to obtain any particulars, while the alarming mass of smoke made it a matter of grave concern. The news soon came, however, that Gale and his men were at work and had stopped the progress of the flames.

Leaving the burned district at Tupper Lake in charge of Firewarden Le Bouef and his assistants, I took the train for Fulton Chain in response to a telegram informing me that a fire had broken out on the summit of Black Bear Mountain, in Hamilton county, near Seventh Lake.

With the exception of the Indian Lake fire, the others were on waste or brush lands and in old burnings, involving no destruction of merchantable timber or large hardwood trees. In fact, this was the case with nearly all the fires last season. But this fire on Black Bear Mountain was not only destroying a good piece of virgin forest, but it was on State land. In going up Fourth Lake the mountain was in full view and smoking like a volcano. When night came the summer people in large numbers went out in boats to witness the spectacle which the towering flames produced. Arriving on the ground I found that little was being done to check it, for the firewarden lived in the south part of the town of Morehouseville, about thirty miles distant and with no connecting road. To get there he would have to go around by rail and steamer, a day's journey; and he had neglected to appoint a district firewarden for this part of his town, which, except in the summer months, has but very few residents.

Having an extended acquaintance with the people in each locality, I had no difficulty in finding a competent man who was willing to serve as district firewarden, and accordingly arranged with Fred. Kirch, a local guide, to take charge of this fire. He immediately warned out a large posse and went up the mountain with them. By the next day he had the fire trenched and under control. This fire was started by a picnic party of summer people, who left their coffee fire burning.

Returning to the railroad station at Fulton Chain I took the train to Loon Lake, in Franklin county, where fires had also been reported to me by telegraph. I found everything there well in hand, owing to the efficiency of Mr. Henry N. Paye, the firewarden for the town of Franklin. Mr. Ferd. W. Chase, who has a large hotel property there, had also assisted by sending out some of the men in his employ.

While at Loon Lake I received a telegram to return to Old Forge. From there I went through the chain to the head of Fourth Lake to be sure that the Black Bear mountain fire was receiving proper attention. Meeting Kirch that evening, he assured me that he had the fire under complete control, which was evident on going up the lake, there being little or no smoke in sight.

In the meantime alarming reports of fresh fires were received from the Lower Saranac district, and it became necessary to go there as soon as possible.

It should be explained here that, owing to the alarming conditions, arrangements were made with Governor Roosevelt and Comptroller Morgan for a special emergency fund which enabled us to hire men and pay them without waiting for the slow methods provided in the law.

Arriving at Saranac Lake at daybreak, Protector Vosburgh was instructed to go through the town and hire all the men he could. On passing through Township 20 during the night, several fires were noticed along the railroad which had been kindled by locomotive sparks. Vosburgh's crew, well equipped with the necessary implements, was loaded on a special train before noon, and went down the line, dropping off parties of men at different places on Township 20, wherever a fire had started. Chief Protector Pond joined the party here and rendered valuable assistance in superintending some of the work.

Having distributed the men at different points of danger, the train was ordered to run to Loon Lake so that we could ascertain the condition of affairs in that locality. The fires in that vicinity being evidently under control, the train returned to Saranac Junction. While waiting there to pass the express, dark, heavy columns of smoke could be seen rolling up from a large fire in the vicinity of Paul Smith's station, where the open, waste lands at that place were being burned over by a fire caused by locomotive sparks. Our train had just passed through the edge of this fire as we came from Loon Lake. Another and more serious conflagration was raging in the opposite direction, along the line of the junction railroad, and traveling towards the Ampersand Hotel. Finding that there were enough men working at these fires to prevent the flames from spreading, the train was ordered to Tupper Lake, passing on our way there the fires of Township 20, at which Vosburgh's gangs were at work with evident success.

At Tupper Lake Junction we found the fires substantially out; but the open country which adjoins the station on every side was still smoking hot for a mile or more in every direction, with a fringe of little brush fires along the border of the burned district where the men were still at work trenching.

While at the Junction I received a telegram from Mr. James Hickey, Indian

Lake, in reply to one sent him that morning, informing me that the fires in his vicinity had broken out again and were under alarming headway. I accordingly took the night train south, and passing through Albany the next morning arrived at North Creek that noon, August 20.

An eighteen-mile drive brought me to Indian Lake where I again found the fires burning fiercely in several places. They were on the same ground as those which occurred when I was at Indian Lake on August 7th, and which were nearly extinguished by showers two days after they started. But at that time the men left the ground without completing their work, which, aided by the dampness after the rain, would have been easy. Some sparks were left smoldering in dead timber or old stumps, or in the duff, which, after a few hot, dry days, were easily fanned into flame by the wind.

Acting under instructions, I employed all the men I could get at two dollars per day, not including board. These men, as fast as they were hired, were sent to different places, most of them under charge of Mr. Carlos Gilson, a justice of the peace, who, by virtue of his office, is authorized to take charge of a fire in the absence of the firewarden. In the meantime, Mr. Robt. B. Nichols, a district firewarden, drove rapidly through the settlements on Township 15 and other parts of the town warning out men. A sufficient force was soon organized, and the fires were checked in their course. The next day there were heavy thunder showers and continuous rains, which extended over all northern New York, bringing a welcome relief from the serious dangers which threatened the woods in every direction.

The danger, however, was not wholly passed. The rainfall was heavy and continued for a day or more; but still the fires were not completely extinguished. From each burned and blackened area smoke could still be seen in various places, showing the existence of lingering fire that was ready to break out again as soon as dry weather would permit. To guard against this contingency it was necessary that some men should remain on watch at each burned district.

It was impossible, by any ordinary means, to completely extinguish these smoldering fires. The sparks not only clung to the old logs and stumps, but they burrowed in the ground out of sight. To completely extinguish these lurking embers, it would be necessary to dig up the entire burned area. Little could be done except to watch the ground night and day, extinguishing the little flames that started up here and there, and wait patiently for the fall rains that came at last, and with their long-continued downpour drenched the land completely. Then, and not until then, was the last fire fighter and watcher allowed to go home.

I have explained here the necessity, in a dry season, of keeping "watchers" on

duty after a fire, even when there was rain, because the large number of days' work returned this year was partly due to the employment of men for this purpose.

While at Indian Lake I received a telegram from Dr. B. E. Fernow, of the State Forestry College, announcing a large fire on the university lands near Axton, Franklin county, and calling for assistance. In reply I telegraphed him to employ whatever men were necessary, and that the State would furnish the money to pay them.

The rain on the 21st having rendered everything comparatively safe, I left Indian Lake and returned to the Saranacs, where I found that owing to continuous showers the men who were working there were through with the fire fighting, but were still on watch around the various burned districts.

I have outlined here only some of the general features of the work which devolved on the Department during the serious emergency last summer. The limited pages of this preliminary report will not suffice for recounting all the movements, operations and business details incidental to the management of the Forest Preserve at such a time.

Mention should be made, however, of the good work done at the fires which threatened the Cornell University forests on Township 23, in Franklin county. A large number of men were employed, and, under the direction of Profs. Fernow and Roth, they succeeded in holding the fire, so that very little green timber was injured, the burned district in this case including only a few acres of forest aside from the barren plains on which the fire originated.

At one time the outlook around the Upper Saranac Lake was serious. Township 20, one of the most beautiful and valuable in the entire forest, and a part of the State Preserve, was in great danger. The owners of the beautiful cottages on the west shore of the lake had all their guides and other help at work to save their buildings. The thick smoke obscured the view in every direction, even for a very short distance, and increased the anxiety of the people. The guests at the hotel had their trunks packed and on the docks awaiting the steamers which were ready, if necessary, to take them to some place of safety.

Unfortunately, owing to a lax organization, there was no firewarden in the town. Meeting Commissioner Babcock, I suggested the appointment of Willard Boyce, and placed him in charge. This appointment was approved and made permanent at the next meeting of the Board. Boyce, who was road commissioner for the town of Santa Clara, had a large number of men at work on the new road from Saranac Inn to Wawbeek Lodge. He ordered all these men to leave the road and fight fire.

Some of these fires were started by sparks from the locomotives on the Mohawk and Malone Railroad. The fire at Bog River was due to this cause, and it would have destroyed the railroad bridge there had it not been for the efforts of Chief Protector Pond and his men.

Another dry spell occurred in September, resulting in large fires in the outlying districts. The September fires were numerous in the more open country in Lewis, Jefferson, St. Lawrence and Warren counties. The forests of the interior districts, however, suffered little or no damage from the September fires.

A careful tabulation of the firewardens' reports for August and September, 1899, shows that during the dry season the losses from forest fires in the Adirondack counties were as follows:

Number of acres burned over	51,565
Of which the State owns	3,558
Number of days worked	15,560 1-2
Estimated loss in timber	$60,121

The cause of fire, so far as could be ascertained, was as follows:

Hunters	62
Fishermen	15
Berry pickers	30
Abandoned camp fires	37
Picnic parties	10
Clearing land	31
Railroad locomotives	24
Tobacco smokers	11
Lightning	9
Incendiaries	9
Children	7
Matches	7
Bee hunters	3
Burning buildings	5
Unknown	62
	322

The amount paid by each county for fighting fire is not known at present, for the accounts have not been presented to this office yet for the half due from the State. In Lewis county the amounts expended by the various towns were:

Croghan	$2,146 06
Denmark	485 00
Diana	3,000 00
Greig	764 00
Highmarket	4 00
Lowville	94 40
Lyonsdale	1,220 00
Martinsburgh	29 00
Montague	36 00
New Bremen	328 00
Osceola	27 25
Turin	1,700 00
Watson	510 86
	$10,344 57

Under the provisions of the Forestry Law one-half of this must be repaid to the towns by the State.

A remarkable fact in connection with the fires last summer is that while the number of fires in the Adirondack counties was phenomenally large, none occurred in the Catskill counties during the dry season except three small ones, which were extinguished before any damage was incurred.

The loss in timber in the Adirondack fires — $60,121 — will seem small as compared with the acreage, 51,565 acres. But it must be remembered that a very large proportion of the burned districts consisted of waste lands, old clearings, windfalls and tracts that had been burned over before or were covered with a worthless second-growth of small, scrubby trees. Nearly all these fires in the open country stopped when they reached a piece of green timber.

The methods employed in fighting these fires varied with the conditions. The ground or surface fires were generally checked by whipping out the small flames with brush, throwing dirt on the burning leaves and other material, plowing furrows, digging trenches, and carrying water when it could be found near by. Hoes, shovels, grub hoes, brush brooms and water pails were the principal tools in use. When there was a top fire, or when the flames were traveling rapidly through a tall undergrowth, back-firing was resorted to, and in each case so far as reported, with success.

Some of the many telegrams received and sent in relation to the forest fires last summer are inserted here to give some idea of the widespread territory in which

they occurred and the difficulties which arose at times, difficulties and conditions for which the Superintendent is in no way responsible.

The following telegrams were received by the Superintendent:

"INDIAN LAKE, *August* 11, 1899.

"Had two severe showers. Think fire is all out. If not, will notify you.

"JAMES HICKEY."

"OLD FORGE, *August* 16, 1899.

"I cannot possibly attend to fire burning in this vicinity.

"D. NORTON."

"PAUL SMITH'S, *August* 18, 1899.

"Will you immediately appoint firewarden in town of Brighton to succeed E. C. Pine, who is no longer a resident. Would suggest appointment of Benjamin A. Muncil. Great fires raging all about here. Wire appointment.

"PAUL SMITH HOTEL CO."

"INDIAN LAKE, *August* 20, 1899.

"The woods are all afire, and spreading very rapidly. Townships 17 and 22 mostly all burned over, and it looks from here as though all that range of mountains is on fire.

"JAMES HICKEY."

"INDIAN LAKE, *August* 23, 1899.

"No rain yet. Sun shines bright this morning.

"JAMES HICKEY."

"BLUE MT. LAKE, *August* 29, 1899.

"Medium size fire near Marion River carry, on Township thirty-five.

"J. G. THOMPSON."

"SAGAMORE LODGE, *August* 29, 1899.

"Fire started and burning fiercely on mountain near Sargent's Pond, Township 34, Totten & Crossfield.

"W. WEST DURANT."

"BLUE MOUNTAIN LAKE, *August* 30, 1899.

"Have had men at Sargent Pond fire since yesterday morning. Write you particulars to-day.

"B. F. MERWIN."

"BLUE MOUNTAIN LAKE, *August* 30, 1899.

"Fire at Sargent's Pond was not bad until this P. M. Have more men and hope to get the best of it to-morrow, and think we can.

"B. F. MERWIN."

"LAKE PLEASANT, *August* 30, 1899.

"Will start with men to-day.

"F. W. ABRAMS."

"BLUE MOUNTAIN LAKE, *August* 31, 1899.

"All fires under full control. No damage to speak of.

"B. F. MERWIN."

"OLD FORGE, *August* 31, 1899.

"Have heard of no fires north of Big Moose. Will be at Beaver river at noon and will investigate.

"D. B. SPERRY."

"SPECULATOR, *September* 5, 1899.

"Fire checked from going any farther. Will have to burn until it gets to foot of mountain. Shall I keep my men to watch it? Answer.

"F. C. ABRAMS."

"NORTH CREEK, *September* 14, 1899.

"There is a fire near West mountain, Township 41, Raquette lake.

"C. HUTCHINS."

"RAQUETTE LAKE, *September* 15, 1899.

"Hard to get men. Will try to send some up to-morrow.

"C. H. BENNETT."

"RAQUETTE LAKE, *September* 17, 1899.

"Can get eight or ten men, $2 a day and board. Shall I send them?

"C. H. BENNETT."

"INDIAN LAKE, *September* 18, 1899.

"Fire still burning fiercely. Township 17 about gone. Big fire at The Glen, town of Warrensburg; also Gore mountain, town Johnsburg. West mountain fire raging Township 41. Men still working. Paid Nichols' men in part; pay balance day or two.

"WM. WOLF."

"SARANAC LAKE, *September* 20, 1899.

"Had nice rain last night, and some rain to-day.

"I. VOSBURGH."

"INDIAN LAKE, *September* 20, 1899.

"Yes, and a very good rain.

"OLIVER ST. MARIE."

"ST. HUBERT'S INN, *September* 21, 1899.

"Raining very little here to-day.

"ORLANDO BEEDE."

"MCCALLOMS.

"Fire is doing great deal of damage south of Mountain pond, State lands. Have notified warden. Can you take proper steps to stop it?

"C. A. MCARTHUR."

"OLD FORGE, *September* 21, 1899.

"Yes; light rains during last thirty-six hours.

"F. B. PECK."

"INDIAN LAKE, *September* 21, 1899.

"Raining some all the time.

"OLIVER ST. MARIE."

"SARANAC LAKE, *September* 21, 1899.

"It rained last night. Showers to-day.

"I. VOSBURGH."

The following telegrams were sent by the Superintendent:

"ALBANY, *August* 31, 1899.

"D. B. SPERRY, Big Moose, N. Y.:

"Fire is reported in your town on Beaver river. Letter from L. F. Stanton. He complains that no one is fighting these fires except himself and two neighbors. Send some men there. State will pay them from Albany."

"ALBANY, *September* 15, 1898.

"CHARLES H. BENNETT, Raquette Lake, N. Y.:

"Fire reported on West mountain near Racquette lake. Have any men gone there to fight it?"

"ALBANY, *September* 15, 1898.

"T. D. BROWN, Firewarden, Wells, N. Y.:

"Did you send any men to fight fire on Township 9? Is that fire still burning?"

"ALBANY, *September* 15, 1899.

"CARLOS HUTCHINS, Indian Lake, N. Y.:

"W. D. Jennings is firewarden for the town of Long Lake. I cannot reach him by telegraph. Go to Raquette lake, and warn out men to fight fire on West Mountain."

"ALBANY, *September* 16, 1899.

"ROBERT NICHOLS, Indian Lake, N. Y.:

"Will send money by messenger this afternoon. Keep your men at work as long as there is danger."

"ALBANY, *September* 19, 1899.

'CLAYTON ORMSBY, Horicon, via Warrensburg, and telephone:

"You have been appointed firewarden for the town of Horicon. Order out men and attend to the fires in your town."

"ALBANY, *September* 15, 1899.

"Hon. C. H. BABCOCK, Saranac Inn, N. Y.:

"Firewarden Nichols says men will quit to-morrow night unless paid. He has a few men watching fires until rain comes. It will not be safe for them to leave."

"ALBANY, *September* 20, 1899.

"ISAIAH VOSBURGH, Saranac Lake, N. Y.:

'Have you had any rain, and how much?"

"ALBANY, *September* 21, 1899.

"ORLANDO BEEDE, St. Hubert's Inn, Keene Valley, N. Y.:

"Are you having any rain to-day at your place? Answer my expense."

"ALBANY, *September* 21, 1899.

"OPERATOR, Old Forge, N. Y.:

"Are you having any rain at your place?"

"ALBANY, *September* 21, 1899.

"ISAIAH VOSBURGH, Saranac Lake, N. Y.:

"Is it raining now at Saranac lake?"

The pay for men working at a forest fire is fixed by law at $2 per day. Out of this the men have to pay for their board, which, when provided by the firewarden or boarding houses, is generally deducted at the rate of fifty cents per day, leaving $1.50 for the day's wage.

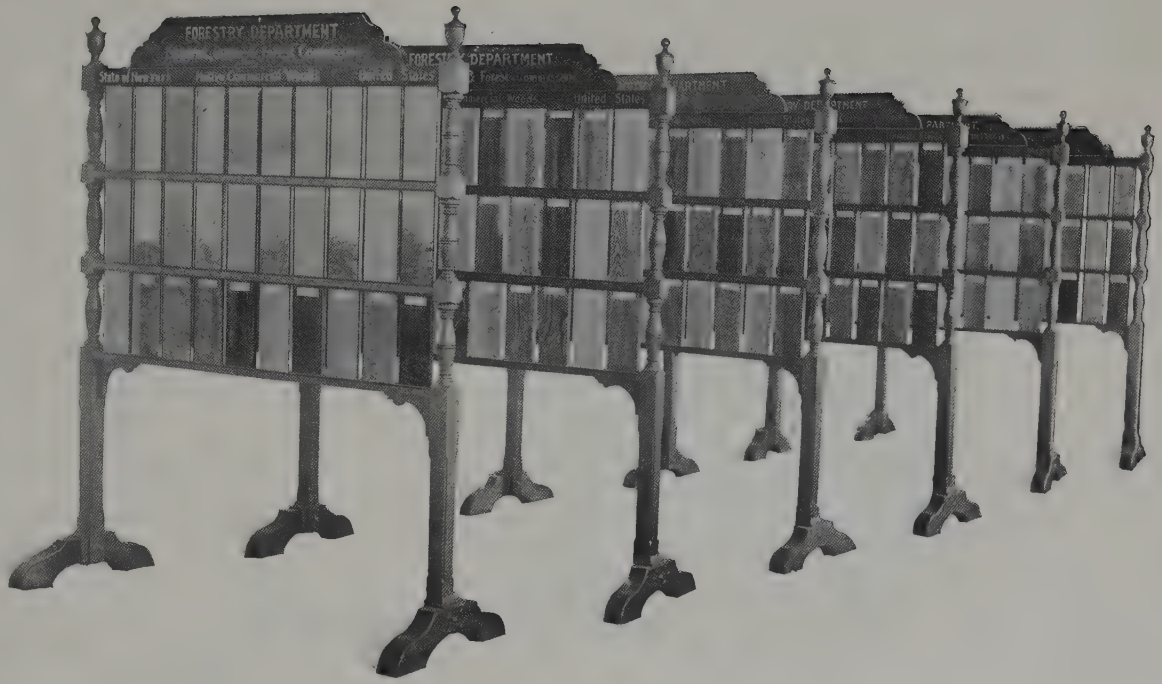
It has been claimed by some persons that these wages are too high; that fires are started in order to get pay for working at them; and that so long as the pay is fixed at the present rate there will be too many fires. I notice, however, that many of the people who are volunteering these suggestions are the same ones who a few years ago, under the old law, were wont to declaim loudly that the price paid for fighting fire was too low, and that the firewardens would never be able to get good men at that rate.

While it is conceded that fires have been started in the woods by incendiaries, the evidence in each case showed that it was done for revenge; and that the act would have been committed just the same, no matter how low the rate of pay for fighting fire.

At the same time it should be understood that fighting fire is hard, dangerous work. The guides who receive $3 per day and their board do not like to work at a fire for less than $2 and board themselves. During the spring fires the river drivers are often called upon to leave their work — which commands high wages — and go to a forest fire. A reduction in price will not make this class of fire fighters any more willing or efficient. The better class of men, the ones who are needed at a fire, are difficult to get, even under the present arrangement.

The law provides for compulsory service at a forest fire. A firewarden may order "any person in his district" to go with him; and any one who refuses to obey such summons is liable to a fine of $10. But this is seldom enforced, for the firewardens have learned by experience that the services of the unwilling man are worthless.

I have further to report that the forestry exhibit prepared by this Department for the Paris Exposition is completed and awaiting shipment. This exhibit



PARIS EXPOSITION, 1900 — FORESTRY EXHIBIT.

COMMERCIAL WOODS OF THE STATE OF NEW YORK.

PARIS EXPOSITION — FORESTRY EXHIBIT.

FRAME NO. 2.

consists of a complete collection of specimens of all the commercial woods native to the State of New York. It includes seventy-nine different species and 180 pieces of wood. Each specimen is twelve inches long, five inches wide, and three-quarters of an inch thick.

There are two samples of each species. One shows the rough surface as it comes from the saw, while the opposite side has a smooth surface showing the appearance of the wood as worked in a planing machine or under a carpenter's hand plane. The second piece is finished in oil on one side; and, on the other side, in varnish, with a fine polish or "piano finish." A few species are represented by more than two pieces, in order to better show some of the beautiful peculiarities of the wood, such as curly and bird's eye maple, and, also, to show its appearance when quarter sawed or otherwise. The specimens are arranged in rows on six upright frames, with three rows and thirty pieces on each frame. The collection embraces the following species:

Cucumber Tree,	*Magnolia acuminata.*
Tulip Tree or Yellow Poplar	*Liriodendron tulipifera.*
Basswood,	*Tilia Americana.*
Ailanthus,	*Ailanthus glandulosus.*
Horse Chestnut,	*Aesculus hippocastanum.*
Hard, Rock, or Sugar Maple,	*Acer saccharinum.* Wang.
Red or Swamp Maple,	*Acer rubrum.*
White or Water Maple,	*Acer dasycarpum.*
American Holly,	*Ilex opaca.*
Staghorn Sumach,	*Rhus typhina.*
Coffee Tree,	*Gymnocladus dioicus.*
Locust,	*Robinia pseudacacia.*
Wild Red Cherry,	*Prunus Pennsylvanica.*
Black Cherry,	*Prunus serotina.*
Apple,	*Pyrus malus.*
American Crab Apple,	*Pyrus coronaria.*
Sweet Gum,	*Liquidambar Styraciflua.*
Flowering Dogwood,	*Cornus florida.*
Tupelo or Sour Gum,	*Nyssa sylvatica.*
Persimmon,	*Diospyros Virginiana.*
Black Ash,	*Fraxinus sambucifolia.*
White Ash,	*Fraxinus Americana.*
Green Ash,	*Fraxinus viridis.*

Red Ash,	*Fraxinus pubescens.*
Sassafras,	*Sassafras officinale.*
American Elm,	*Ulmus Americana.*
Red or Slippery Elm,	*Ulmus fulva.*
Rock Elm,	*Ulmus racemosa.*
Hackberry,	*Celtis occidentalis.*
Butternut,	*Juglans cinerea.*
Black Walnut,	*Juglans nigra.*
Sycamore,	*Platanus occidentalis.*
Red Mulberry,	*Morus rubra.*
Mocker-nut Hickory,	*Carya tomentosa.*
Pig-nut Hickory,	*Carya porcina.*
Shell-bark Hickory,	*Carya alba.*
King-nut Hickory,	*Carya sulcata.*
Small-fruited Hickory,	*Carya microcarpa.*
Bitter-nut Hickory,	*Carya amara.*
Black Oak,	*Quercus tinctoria.*
Red Oak,	*Quercus rubra.*
Chestnut Oak,	*Quercus Prinus.*
Scarlet Oak,	*Quercus coccinea.*
Black Jack Oak,	*Quercus nigra.*
Chinquapin Oak,	*Quercus Muehlenbergii.*
Pin Oak,	*Quercus palustris*
White Oak,	*Quercus alba.*
Burr Oak,	*Quercus macrocarpa.*
Post Oak,	*Quercus obtusiloba.*
Swamp White Oak,	*Quercus bicolor.*
Chestnut,	*Castanea vesca.*
Beech,	*Fagus ferruginea.*
Blue Beech,	*Carpinus Caroliniana.*
Hop-Hornbeam or Ironwood,	*Ostrya Virginica.*
Black or Sweet Birch,	*Betula lenta.*
Yellow Birch,	*Betula lutea.*
River Birch,	*Betula nigra.*
White Birch,	*Betula populifolia.*
Canoe Birch,	*Betula papyracea.*
Peach Willow,	*Salix amygdaloides.*

Black Willow,	*Salix nigra.*
Small American Aspen or Poplar,	*Populus tremuloides.*
Large American Aspen or Poplar,	*Populus grandidentata.*
Swamp Poplar,	*Populus heterophylla.*
Balsam Poplar or Balm of Gilead,	*Populus balsamifera, var. candicans.*
Cottonwood,	*Populus monilifera.*
White Cedar or Arbor Vitæ,	*Thuja occidentalis.*
Red or Norway Pine,	*Pinus resinosa.*
White Pine,	*Pinus Strobus.*
Pitch Pine,	*Pinus rigida.*
Jersey Pine,	*Pinus inops.*
Yellow Pine,	*Pinus mitis.*
Northern Gray Pine,	*Pinus Banksiana.*
Hemlock,	*Tsuga Canadensis.*
Red Spruce,	*Picea rubens.* Sarg.
Black Spruce,	*Picea nigra.*
White Spruce,	*Picea alba.*
Balsam,	*Abies balsamea.*
Red Cedar,	*Juniperus Virginiana.*
Tamarack,	*Larix Americana.*
Mountain Ash,	*Pyrus sambucifolia.*

In planning this exhibit I endeavored to prepare something different from the ones shown in the forestry building at the Chicago Exposition. The collection is unique in its design and attractive in appearance. Some of the specimens, by reason of the rare beauty of the wood, combined with the elegant, artistic finish, will afford a pleasant surprise to many who are already familiar with the woods of our State. The commercial character of the exhibit cannot fail to please all whose business or occupation might cause them to take a practical interest in such a collection.

I desire to acknowledge the valuable assistance rendered by Mr. A. B. Strough in preparing this exhibit. His practical acquaintance with our native woods enabled him to carry out my plans and complete the work to my entire satisfaction.

I have further to report that the edition of the new Catskill map — 2,500 copies — is just received, and is ready for distribution under such directions as may seem proper to your Board. In view of the repeated attempts to bring out this map, and the many obstacles and discouragements encountered, there is good reason for congratulation on the completion of the work.

The map embraces the four counties of Greene, Ulster, Delaware and Sullivan, in each of which are situated lands belonging to the Forest Preserve. It is the first map to show on one sheet the complete landed allotment of these four counties. Although designed primarily as a real estate map for use in the office of this Department, it will prove valuable, also, as a geographical one, showing, as it does, all the towns, villages, post-offices, roads, streams and mountains.

The State owns about 66,000 acres of forest in these counties, the location of this land being shown on the map in red. This amount does not include the extensive purchases recently made by the Forest Preserve Board, which are now awaiting the transfer of title. The publication of this map is opportune, for it will prove valuable in determining the areas that are best located for a further enlargement of the Catskill Preserve. It will, also, be an aid to the foresters in protecting the State lands, as each lot in the Catskill Preserve is colored on the map, its location being apparent at a glance.

The original draft of the map was made, under my direction and supervision, by Mr. J. Y. McClintock, the assistant superintendent and engineer. The engraving was intrusted to Julius Bien & Co., of New York, a firm whose imprint is synonymous with all that is excellent in cartography.

Thanking your Board for the favorable consideration which they have always accorded to each suggestion or recommendation that I may have ventured, I would respectfully submit the foregoing for your further information and attention.

WILLIAM F. FOX.

State Reservation on the St. Lawrence.

THE lands and islands constituting the St. Lawrence Reservation or Park were enumerated in our last report. Substantial docks of a size suitable for steamboats to land at have been constructed at Cedar Island, Kring Point, Island Mary, De Wolf Point, Watterson Point, Delany or Canoe Point, Picnic Point and at Cedar Point. Small docks for skiff landings have also been constructed at all the above-mentioned places excepting at Cedar and Picnic Points, and the dock at Lotus Island has been placed in good repair.

Provision has been made for the erection of open pavilions at nine different places on said reservation. Outbuildings were erected at the same time the docks were built.

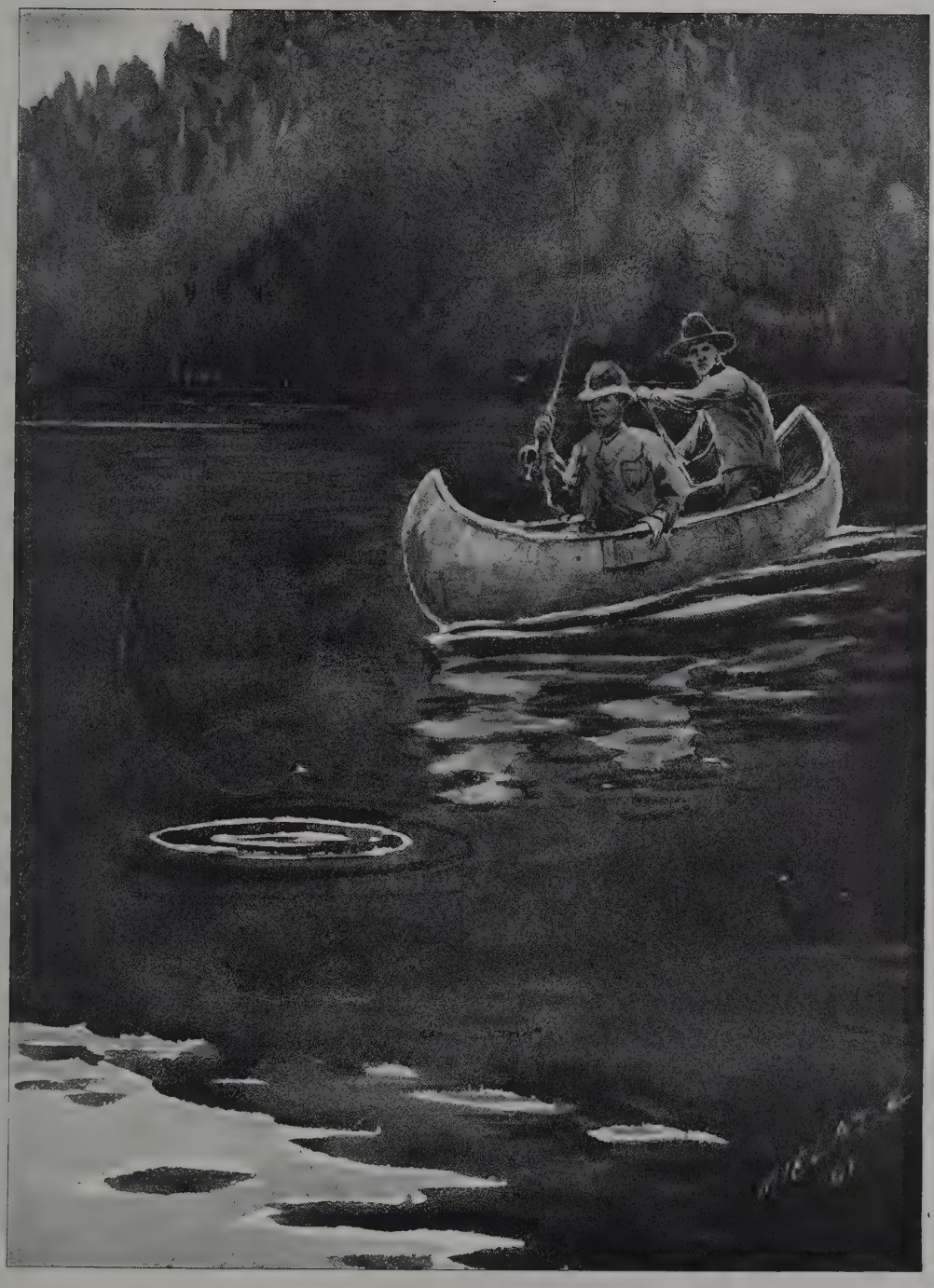
The various points and islands have been cleaned up at considerable labor and are now in excellent condition for camping and dining parties.

State land notices and also cautionary fire notices have been posted on the various places.

The law creating the reservation specified that one of the present fish and game protectors should be appointed superintendent thereof and conferred on him authority of a police constable. This provision of the law was complied with by appointing Protector Joseph Northup, of Alexandria Bay, as such superintendent.

The various places belonging to the State were extensively used during the usual pleasure season last year, and the popularity of the park as such is great not only with pleasure seekers from the cities stopping there temporarily, but also with the permanent residents of that locality.

To properly superintend and maintain the lands and buildings, making such repairs as are found necessary from time to time, a small appropriation is needed, and we recommend that $2,000 be placed at the disposal of the Commission for that purpose.



A MISS.

Suggestions and Recommendations.

Pollution of Streams.

WE would recommend that section 100 of chapter 974 of the Laws of 1895 be so amended as to more fully protect the waters of the State against pollution.

Bringing Actions.

We would recommend that sections 232 and 244 of the Game Law be changed so that actions may be brought in adjoining counties as well as the county where the offense is committed, or where the defendant resides, if constitutional. (For reference see section 3, chapter 577, Laws of 1888, which gave permission to bring actions in the counties in which the violations occurred or in the adjoining counties.)

Uniform Laws.

We would recommend uniform fish and game laws, covering the whole State, as to close seasons and prohibiting shooting of wild fowl from March 1st to September 1st.

We would recommend that the season for deer hunting open September 15th instead of August 15th.

We would recommend a closed season during the month of November for whitefish, as that is the month in which said fish spawn, and they run in shoal waters and can be taken in large numbers during that time.

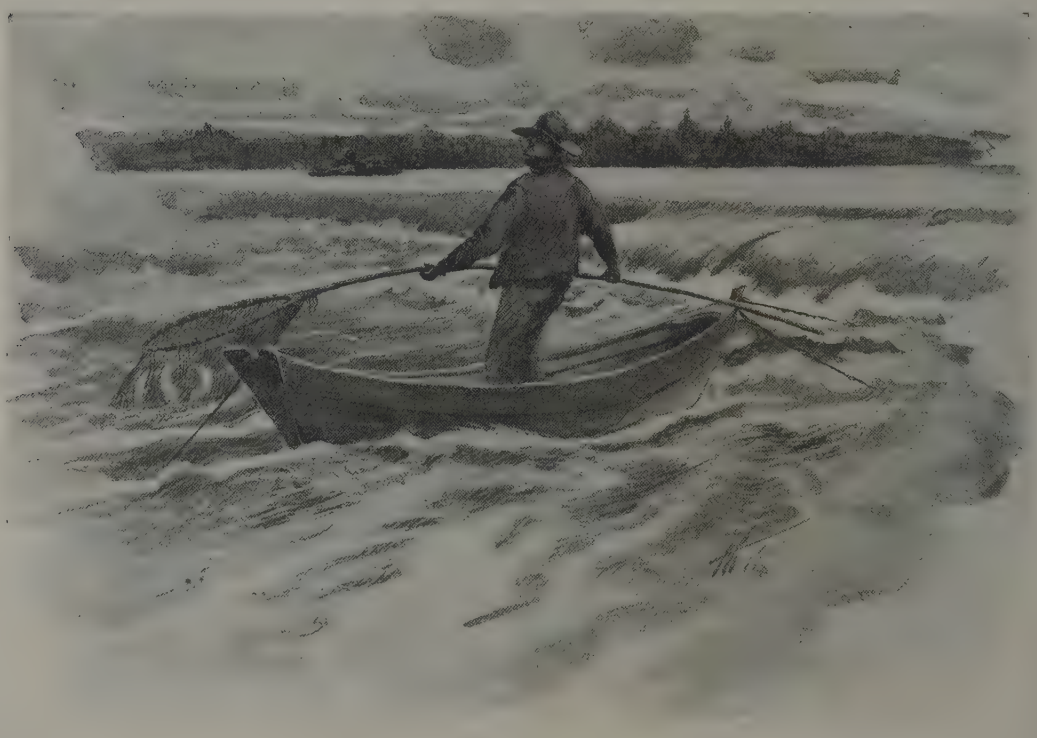
Section 143 of the Fisheries, Game and Forest Law provides that "Eel pots of a form and character such as may be provided by the rules of the Commissioners of Fisheries, Game and Forests, may be used in any waters not inhabited by trout, lake trout, salmon trout or land-locked salmon."

We would recommend that this section be so amended as to permit the use of eel pots of a form to be prescribed by the Commission in any waters, as it is in waters inhabited by various members of the salmon family, which include all trout, that eels do the greatest injury by eating the spawn on the spawning beds as soon as the eggs are deposited. Lake trout spawn in the autumn, at night, on shoals; and at such times as the trout are on the shoals for the purpose of spawning the

eels gather in large numbers and have been seen eating the spawn almost as quickly as it is deposited, and before the parent fish can cover it with gravel. Eel pots of a form to be prescribed by the Commission would not take trout of any kind.

We would recommend that the law allowing the use of set lines in Canandaigua lake be so amended as to embrace the following lakes: Skaneateles, Keuka, Seneca, Cayuga and Owasco.

Inasmuch as the Dominion of Canada imposes a tax for hunting and fishing (except on the St. Lawrence river within the boundaries of the St. Lawrence River Park) against citizens of this State, we would recommend that a similar tax be imposed upon the citizens of the Dominion of Canada.



DIPPING HERRING.

Distribution of Fish.

Schedule of Waters Stocked for the Fiscal Year Ending September 30, 1899.

DISTRIBUTION OF BROOK TROUT FRY.

NAME OF APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
Lewis R. Smith,	Finger Creek,	Gallatin,	Columbia,	5,000
H. B. Vedder,	Spaulding and Vedder Brooks,	"	"	8,000
E. E. Kelley,	Tribut. of Black & Mill Creeks,	Ohio,	Herkimer,	5,000
Wm. A. Hoyt,	Beers Lock Stream,	Ancram,	Columbia,	10,000
Wm. W. Streever,	Cook Brook,	Milton,	Saratoga,	10,000
Olean Sportsmen's Club,	Nine & Ten Mile Streams,	Olean,	Cattaraugus,	15,000
C. T. Leland,	Several different brooks,	Schroon,	Essex,	15,000
M. W. Mosely,	Owlkill Stream,	White Creek,	Washington,	10,000
"	Whipple Brook,	Cambridge,	"	10,000
W. D. Snell,	Big Brook and tributaries,	Worth,	Jefferson,	5,000
John Francisco,	Cold Brook Stream,	Bloomville,	Delaware,	15,000
E. G. Butler,	Stockwell Brook,	Guilford & Bainbridge,	Chenango,	10,000
Willis E. Clark,	Laurence, Taylor & Sanders' Brooks,	Moira & Dickinson,	Franklin,	15,000
De Ruyter Sportsmen's Club,	Tioughnioga River,	De Ruyter,	Madison,	20,000
Groton Fish and Game Club,	Fall Creek & Owasco Inlets,	Groton,	Tompkins,	25,000
Otsego Fish Association,	Leatherstocking and five other creeks,	Springfield, Middlefield & Milford,	Otsego,	25,000
Jared Mallory,	Little Bay & Shanty Creeks,	Hastings & West Manor,	Oswego,	5,000
Louis Fleischman,	Bush Kill,	Middletown,	Delaware,	10,000
A. P. Harper,	West branch of St. Regis River,	Parishville,	St. Lawrence,	15,000
A. B. Pitney,	Whipple Brook,	Cambridge,	Washington,	10,000
O. H. Perry,	Shaker Hollow Creek,	White Creek,	"	8,000
"	White Creek,	"	"	8,000
H. R. Phillips,	Potter Stream,	Benton,	Yates,	10,000
Geo. W. Egglefield,	East branch of Au Sable River,	Keene,	Essex,	30,000
Geneganslet F. & G. P. Assn.,	Geneganslet Creek,	Smithville,	Chenango,	20,000

DISTRIBUTION OF BROOK TROUT FRY — CONTINUED.

NAME OF APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
Chas. Moon,	Deer Lodge Brook,	Dannemora,	Clinton,	8,000
W. L. Mead,	Nash and Bean Brooks,	"	"	10,000
Robert Lafontaine,	Water Tank Brook,	"	"	8,000
Myron Cummings,	Smith Inlet Brook,	"	"	15,000
Geo. W. Cooper,	Willowemoc Creek,	De Bruce,	Sullivan,	10,000
U. S. Grant Cure,	Birch Creek,	Pine Hill,	Ulster,	10,000
F. Sawyer,	Upper Chateaugay Lake,	Lyon Mountain,	Clinton,	20,000
Peter Flint,	Buck Mountain Pond,	Ticonderoga,	Essex,	5,000
W. H. Sexton,	Pleasant Brook,	Smyrna,	Chenango,	10,000
G. F. Close,	Ackley Brook,	"	"	10,000
Loon Lake Hotel Co.,	Loon Lake,	Franklin,	Franklin,	20,000
Arthur Boehm,	Stony Creek and tributaries,	Hope,	Hamilton,	20,000
W. H. Sawyer,	Champlain River,	Ellenburg,	Clinton,	8,000
F. F. Smith,	Saranac River,	Franklin,	Franklin,	20,000
Wm. E. Ames,	Wharton Brook,	Exeter,	Otsego,	10,000
L. P. Cole,	Manorkill Creek,	Conesville,	Schoharie,	10,000
R. G. Davenport,	Various streams,	Wells,	Hamilton,	25,000
P. W. Mitchell,	Delaware River,	Roxbury,	Delaware,	20,000
Frank E. Kuran,	Batavia Kill,	Windham,	Greene,	10,000
O. H. Clark,	Branch of Croton River,	Croton Falls,	Westchester,	5,000
Henry McArthur,	Mart Snyder's Brook,	Ancram,	Columbia,	5,000
Palan Pulver,	Westfall Brook,	"	"	5,000
W. D. Shults,	Shadow Brook,	East Springfield,	Otsego,	10,000
W. D. Ball,	Wilna Creek,	Wilna,	Jefferson,	5,000
Daniel Sparks,	Allen Creek,	Ephratah,	Fulton,	10,000
G. W. Lamont,	Big Indian Pond,	Big Indian,	Ulster,	20,000
J. M. Case,	Flat Creek Stream,	Gilboa,	Schoharie,	15,000

DISTRIBUTION OF BROOK TROUT FRY — CONTINUED.

NAME OF APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
J. M. Case,	Mackey Stream,	Gilboa,	Schoharie,	10,000
J. C. Jones,	Harford Stream,	Harford,	Cortland,	15,000
A. F. Finch,	Stewart Brook,	Rockland,	Sullivan,	30,000
Wm. Keener,	Horse Brook,	Colchester,	Delaware,	10,000
E. J. Johnson,	Handsome Brook,	Franklin,	"	15,000
Chas. Scott,	Mother Brook,	Palatine,	Montgomery,	10,000
Zenophon Disbrow,	Steel Stream,	Conesville,	Schoharie,	10,000
H. E. Freelan,	Otsego Creek tributaries,	Hartwick,	Otsego,	10,000
Lincklaen Sportsman's Club,	Burdick Settlement Creek,	Lincklaen,	Chenango,	10,000
" "	Davis Pond,	"	"	5,000
J. B. Hawver,	Manorkill Stream,	Conesville,	Schoharie,	10,000
H. Genung,	Fall Creek,	Dryden,	Tompkins,	10,000
La Fayette Turner,	Hilliard Brook,	Schuyler Falls,	Clinton,	8,000
A. M. Russell,	East Branch Chenango River,	Hamilton,	Madison,	10,000
W. A. Smythe,	Owego Creek,	Owego,	Tioga,	10,000
B. F. Vail,	Wawayanda Creek,	Warwick,	Orange,	5,000
Cortland County S. Club,	Various brooks,	Virgil,	Cortland,	25,000
William A. Lee,	Croton River,	Pawling,	Dutchess,	20,000
N. Ossont,	Independence Creek,	Watson,	Lewis,	5,000
Thomas B. Hills,	East branch trib. of Delaware R.,	Middletown,	Delaware,	15,000
J. O. A. Bryers,	Raquette Lake,	Long Lake,	Hamilton,	15,000
Lincoln Kettle,	Bascomb Brook,	Rockland,	Sullivan,	10,000
A. Green,	Darbee Brook,	"	"	55,000
A. S. Prime,	Au Sable River and others,	Jay,	Essex,	10,000
Ira S. Smith,	Wawayanda Creek,	Warwick,	Orange,	5,000
A. J. Fellows,	Indian Stream,	Chatham,	Columbia,	20,000
Edward Keator,	Warner Kill,	Hunter,	Greene,	15,000

DISTRIBUTION OF BROOK TROUT FRY — CONTINUED.

NAME OF APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
Northern Allegany R. & G. Club,	Wiscoy Creek and others,	Wiscoy,	Allegany,	10,000
U. L. Loomis,	Sauquoit Creek,	Paris,	Oneida,	15,000
F. A. Purdy,	Beaver Brook,	North Salem,	Westchester,	8,000
Washington Chase,	Rich & Harris Lakes	Newcomb,	Essex,	10,000
Cassius Winch,	Conway Pond and others,	Wilmington,	"	10,000
Thomas Glenn,	Beaver River,	Croghan,	Lewis,	20,000
Virgil Palen,	Rondout Creek,	Wawarsing,	Ulster,	8,000
John Sayer,	Mountain Stream,	Warwick,	Orange,	8,000
S. C. Joy,	Tonawanda Creek headwaters,	Java,	Wyoming,	8,000
C. A. Cline,	Webatuck Stream,	North East,	Dutchess,	10,000
Ulster Co. F. & G. Assn.,	Sickles Stream,	Woodstock,	Ulster,	20,000
" "	Bushkill Creek,	Olive,	"	20,000
" "	Snyder Hollow Stream,	Shandaken,	"	20,000
" "	Little Shandaken Stream,	Woodstock,	"	20,000
" "	Birch Creek,	Shandaken,	"	10,000
J. O. Spelman,	Hill Stream and others,	Victor,	Ontario,	5,000
A. J. Merrill,	Rocky Branch and others,	Jay,	Essex,	15,000
Warren Humes,	Oswegatchie River,	Diana,	Lewis,	15,000
M. S. Ives,	Various streams,	Turin,	"	15,000
W. M. Strough,	Spruce Creek and others,	Salisbury,	Herkimer,	15,000
Mathias Burgher,	Bushkill Stream,	Olive,	Ulster,	10,000
A. Vail Smith,	Daly Stream,	Southeast,	Putnam,	8,000
"	Drew Brook,	"	"	8,000
Lewis Weinman,	Potter Brook and others,	Warrensburgh,	Warren,	10,000
David H. Foote,	Lake Piseco,	Arietta,	Hamilton,	25,000
"	Oxbow Lake,	"	"	15,000
Emerson Nye,	Fawn Stream,	"	"	10,000

DISTRIBUTION OF BROOK TROUT FRY — CONTINUED.

NAME OF APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
Wm. Carroll,	Casey Brook,	Columbus,	Chenango,	8,000
A. B. Kutschback, Secy.,	Pleasant Brook,	Sherburne,	"	10,000
Miner M. Cooper,	Marble Brook,	Wilmington,	Essex,	10,000
M. J. Wheeler,	Roeliff Jansenkill,	Gallatin,	Columbia,	8,000
B. C. Dewitt,	Catskill Creek and others,	Durham,	Greene,	10,000
Edgar Sanders,	Sanders Brook and others,	Keene,	Essex,	15,000
Little Valley F. & G. Assn.,	Booktooth Stream and others,	Little Valley,	Cattaraugus,	20,000
L. Miller,	Barakill Stream,	Conesville,	Schoharie,	10,000
Alex W. Mackey,	Bedford Creek,	Rensselaerville,	Albany,	10,000
P. A. Gaffney,	Spring Branch,	Java,	Wyoming,	5,000
Frank Barton,	Knickerbocker Trout Brooks,	Pine Plains,	Dutchess,	10,000
Fred A. Holmes,	West Branch Unadilla River,	Bridgewater,	Oneida,	15,000
James Murty,	Croton River branches,	Patterson,	Putnam,	8,000
Theodore Wheeler,	Mountain Brooks,	South Dover,	Dutchess,	10,000
Albert Laymon,	North Stream,	Conesville,	Schoharie,	10,000
A. L. Kerr,	Kaaterskill Stream,	Hunter,	Greene,	10,000
Ed. Blay,	Bryant Spring Brook,	Ancram,	Columbia,	5,000
George Dart,	Stony Brook,	Ramapo,	Rockland,	10,000
Chas. Rodgers,	Oxbow Lake,	Arietta,	Hamilton,	15,000
W. A. Shapley,	Hoppins' Reservoir,	Lebanon,	Madison,	5,000
W. H. Cunningham,	Thomas Brook,	Chenango,	Broome,	5,000
H. Frank Pulver,	Punch Brook,	Ancram,	Columbia,	5,000
George Hyde,	Honey Meadow,	Stanford,	Dutchess,	5,000
John G. Cole,	Jansen Kill and others,	Gallatin,	Columbia,	5,000
J. H. Grennell,	Mad River,	Camden,	Oneida,	10,000
Black River F. & G. Assn.,	Big Beaver Meadow,	Trenton,	"	40,000
John W. Holt,	Cat Tail Stream,	Rockland,	Sullivan,	10,000

DISTRIBUTION OF BROOK TROUT FRY — CONTINUED.

NAME OF APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
F. B. Bouch,	Martin's Brook,	Colesville,	Broome,	5,000
Edward Ham,	Willow Stream,	Stanford,	Dutchess,	5,000
A. D. Waite,	Little Hoosick River,	Berlin,	Rensselaer,	15,000
Wm. A. Jones,	North Branch Shinglekill,	Cairo,	Greene,	10,000
H. W. Hazen,	Middle Branch Croton River,	Southeast,	Putnam,	5,000
Fred D. Holdridge,	Young's Brook,	Fenner,	Madison,	8,000
H. B. Olthof,	Stone Brook and others,	Freedom,	Cattaraugus,	10,000
O. H. Hilsen,	White and Long Lakes,	Forestport,	Oneida,	15,000
Fred Klosner,	Fish Creek and others,	Highmarket,	Lewis,	15,000
A. S. Emans,	Shenandoah Creek,	East Fishkill,	Dutchess,	5,000
Rufus K. Mulford,	Lyons Brook,	Bedford,	Westchester,	8,000
Jacob Snell,	Briggs Run Creek,	Mohawk,	Montgomery,	10,000
Wm. L. Dicks,	Little Meadow Brook,	Rockland,	Sullivan,	10,000
C. P. Tappey,	Pierson's Brook,	Liberty,	"	10,000
U. S. Messiter,	Washington Brook,	"	"	10,000
C. V. Messiter,	Mongaup Stream,	"	"	10,000
N. C. Currey,	Fisk Brook,	"	"	10,000
Joel C. Fisk,	Branch of Mongaup River,	"	"	10,000
Frank M. Dodge,	Benton Hollow Stream,	"	"	10,000
James Doughty,	Kane Spring Brook,	"	"	10,000
F. W. Lancashire,	Rosa Spring Brook,	"	"	10,000
D. I. Roberts,	Tyler's Brook,	Cochecton,	"	10,000
"	Calicoon Creek,	Calicoon,	"	10,000
"	Oquaga Creek,	Deposit,	Delaware,	10,000
"	Demarest Brook,	New City,	Rockland,	10,000
"	Crum Brook,	"	"	10,000
C. M. Stanley,	Munger Brook,	Cazenovia,	Madison,	15,000

DISTRIBUTION OF BROOK TROUT FRY — CONTINUED.

NAME OF APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
A. B. Downing,	Cowaselon Creek,	Lenox,	Madison,	15,000
D. O. Sharpe,	Delaware River,	Hobart,	Delaware,	10,000
Perry Smith,	Ouleout Stream,	Franklin,	"	10,000
C. E. Sherman,	Charlotte Creek,	Worcester,	Otsego,	10,000
H. Wickham,	Sherman Lake,	Minerva,	Essex,	15,000
Abram Smith,	Branch of Roeliff Jansenkill,	Gallatin,	Columbia,	5,000
Moncure Burton,	Meadow Brook,	East Fishkill,	Dutchess,	5,000
I. J. Delo,	Sawkill River,	Woodstock,	Ulster,	4,000
E. G. Russell,	Fall Brook,	Phillipsport,	Sullivan,	10,000
Wm. H. Walker,	Christie's Creek,	Caledonia,	Livingston,	5,000
H. H. Wilcox,	East Branch Unadilla River,	West Winfield,	Herkimer,	10,000
E. A. Dox,	Cobleskill Creek headwaters,	Richmondville,	Schoharie,	10,000
Chas. Hosmer,	Tonawanda Creek tributary,	Weathersfield,	Wyoming,	8,000
Frank Kisselbrack,	Ham Brook,	Pine Plains,	Dutchess,	10,000
Wm. H. Bartlett,	Mead Brook and others,	Armenia,	"	15,000
Warren Sprague,	Rice Brook,	Brighton,	Franklin,	10,000
Clarence A. McArthur,	Hayes Brook,	"	"	10,000
J. M. Wardner,	Rainbow Lake,	"	"	20,000
Chas. E. Taylor,	White and Sugar Rivers,	West Turin,	Lewis,	10,000
Peter Ossout,	Crystal Creek,	New Bremen,	"	10,000
H. B. Hudler,	Esopus Creek,	Shandaken,	Ulster,	10,000
L. F. Bennett,	East Branch Neversink River,	Denning,	"	10,000
A. M. Warner,	Disbrow Brook,	Harpersfield,	Delaware,	5,000
Arthur A. Tallmage,	Headwaters Delaware River,	Stamford,	"	15,000
Josiah A. Wood,	Pine Creek,	Webb,	Herkimer,	5,000
B. N. Lobdell,	Tributaries of W. Stony Creek,	Benson,	Hamilton,	20,000
"	Tributaries of E. Stony Creek,	Hope,	"	20,000

DISTRIBUTION OF BROOK TROUT FRY — CONTINUED.

NAME OF APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
J. E. Leonard,	Owego Creek,	Richford,	Tioga,	10,000
W. C. Pierce,	"	"	"	10,000
J. Fleming,	East Owego Creek,	Owego,	"	10,000
Harry T. Nowlan,	" "	Newark Valley,	"	10,000
J. W. Campbell,	Campbell Brook,	Colchester,	Delaware,	10,000
Robert Bashaw,	Salmon River tributary,	Black Brook,	Clinton,	8,000
M. F. Bailey,	Meadow Brook,	Hunter,	Greene,	8,000
J. D. Newton,	Westkill Stream,	Lexington,	"	15,000
B. S. Reynolds,	Deer River,	Brandon,	Franklin,	10,000
Worthington Whitehouse,	Sawmill Brook and others,	Greenburgh,	Westchester,	10,000
Joseph H. Erts,	East Branch Neversink River,	Denning,	Ulster,	10,000
Wm. A. Miller,	Round Brook,	Russia,	Herkimer,	8,000
John Miller, Jr.,	Edwin Morris Brook,	"	"	8,000
L. W. Grower,	Little Conklin Brook,	"	"	8,000
Wm. A. Leight,	Fly Brook,	"	"	8,000
E. T. Reed,	Various streams,	Mansfield,	Cattaraugus,	10,000
Geo. Stuart,	Fish Brook,	Wells,	Hamilton,	10,000
Isaiah Perkins,	Mason Lake,	Lake Pleasant,	"	20,000
"	Miami River,	"	"	20,000
"	Jessups River,	"	"	20,000
Wm. S. Nesbitt,	Odell's Brook,	Kortright,	Delaware,	5,000
Warren Kingsley,	Florence Creek,	Amesville,	Oneida,	10,000
A. E. Neal,	Stony Clove Stream,	Edgewood,	Greene,	10,000
Wm. Rutherford,	Trout Brook,	Potsdam,	St. Lawrence,	10,000
Wm. H. Averill,	Spring Creek,	Orwell,	Oswego,	15,000
Chas. A. Martin,	Otsdama Creek,	Otego,	Otsego,	20,000
Geo. E. Rice,	Little Beaverkill,	Parksville,	Sullivan,	5,000

DISTRIBUTION OF BROOK TROUT FRY — CONTINUED.

NAME OF APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
W. R. Woolsey,	Willowemoc River,	Rockland,	Sullivan,	10,000
J. G. Guthheil,	Ten Mile River,	Tusten,	"	10,000
G. W. Amin,	Dry Mill Brook,	Peru,	Clinton,	8,000
N. McGee, Jr.,	Haff Brook,	"	"	5,000
Wm. H. Robinson,	Little Chazy River,	Altona,	"	12,000
Victor W. Weaver,	Weaver Brook,	Schuyler Falls,	"	8,000
Gilbert W. Harris,	Butts Hollow,	Amenia,	Dutchess,	5,000
Chas. C. Bartis,	Whortle Kill Brook,	East Fishkill,	"	8,000
W. B. Mersereau,	Weymouth Creek,	Olean,	Cattaraugus,	10,000
"	Loup Creek,	"	"	5,000
J. C. Cornish,	Birch Stream,	Shandaken,	Ulster,	10,000
John Hubbard,	Conesville Stream,	Conesville,	Schoharie,	10,000
J. K. Grant,	Franklin Stream and others,	Jefferson,	"	20,000
J. W. Simmons,	Worcester Stream,	Worcester,	Otsego,	10,000
A. A. McCoy,	Sacandaga River & branches,	Arietta,	Hamilton,	30,000
Geo. F. Squires,	Conklin Brook,	Russia,	Herkimer,	8,000
N. F. Hodge,	Hodge Stream and others,	Neversink,	Sullivan,	8,000
Jas. McCouch,	Ten Mile River,	Cochecton,	"	15,000
John Collins,	Sands Creek,	Hancock,	Delaware,	5,000
W. F. Stimpson,	"	"	"	5,000
Fred Draper,	Whaley Stream and others,	Beekman,	Dutchess,	10,000
C. W. Baker,	Stafford Brook,	Ausable,	Clinton,	8,000
Fred L. Hinds,	Palmer and Black Brooks,	Black Brook,	"	10,000
W. B. Whitney,	Hunter Brook,	Lexington,	Greene,	10,000
H. P. Swart,	Roeliff Jansenkill,	Hillsdale,	Columbia,	5,000
Gilbert Langdon,	Balls Spring,	Copake,	"	8,000
W. Holsapple,	Roeliff Jansenkill,	"	"	8,000

DISTRIBUTION OF BROOK TROUT FRY — CONTINUED.

NAME OF APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
J. A. Bell,	Roeliff Jansenkill,	Copake,	Columbia,	5,000
W. D. Streeter,	Salmon River,	Richland,	Oswego,	20,000
A. Rowley,	Griffin Creek,	Cuba,	Allegany,	5,000
O. Dunning,	Gilman Lake,	Lake Pleasant,	Hamilton,	20,000
Z. L. Parker,	Spring Brook,	Bath,	Steuben,	50,000
J. H. Lamphiere,	Cold Spring Creek,	Brutus,	Cayuga,	8,000
F. X. Saltzman,	Miller Brook,	Loonsville,	Oneida,	5,000
"	Crystal Creek,	Forestport,	"	5,000
"	Little Woodhull Stream,	"	Herkimer,	5,000
"	Pine Creek,	"	"	5,000
Edward E. Ford,	Otego Creek,	Oneonta,	Otsego,	10,000
Carl Tripp,	Branch Roeliff Jansenkill,	Gallatin,	Columbia,	5,000
W. A. Ross,	Springside Spring Streams	Unionvale,	Dutchess,	8,000
E. Lane,	Clove Creek,	"	"	8,000
Geo. Lasher,	Gardner Hollow Stream,	Beekman,	"	8,000
O. C. Stowell,	Castor Creek,	Orwell,	Oswego,	10,000
J. W. Keller,	Willowemoc Stream,	Rockland,	Sullivan,	10,000
W. O. Ensign,	"	"	"	15,000
E. M. Johnson,	Phelps Brook,	Crown Point,	Essex,	10,000
Albert Weed,	Trout Brook,	Hague,	Warren,	5,000
H. A. Stark,	Great Chazy River,	Altona,	Clinton,	10,000
J. W. Starks,	Sample Brook,	"	"	5,000
Halsey L. Stark,	Smith Wood Brook,	"	"	5,000
Riley Parsons,	N. Br. Moose River,	Webb,	Herkimer,	10,000
Ben Parsons,	First Lake,	"	"	10,000
C. M. Barrett,	Third Lake,	"	"	10,000
Fisheries, Game & Forest Com.,	Cochran Brook,	Rockland,	Sullivan,	25,000

DISTRIBUTION OF BROOK TROUT FRY — CONTINUED.

NAME OF APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
Fisheries, Game & Forest Com.,	Wood Brook,	Rockland,	Sullivan,	30,000
" "	Siple Brook,	Colchester,	Delaware,	90,000
" "	Palmer Brook,	Rockland,	"	30,000
John Hyland,	Mill Creek,	Wayland,	Steuben,	10,000
Dansville F. & G. Assn.,	Vandoron Creek,	"	"	10,000
W. N. Courtney,	Cold Stream and others,	Arietta,	Hamilton,	20,000
A. McIntyre,	Mill Brook,	Lake Pleasant,	"	20,000
"	Kunjamuck River,	"	"	20,000
Edgar S. Morrison,	Lumber Lake,	Arietta,	"	15,000
J. D. Morley,	Sacandaga Lake,	Lake Pleasant,	"	40,000
G. B. Rathbun,	Shadow Brook,	Springfield,	Otsego,	5,000
W. W. Mead,	Mead Pond,	Plattsburg,	Clinton,	5,000
Geo. McAdam,	Canada Creek,	Rome,	Oneida,	5,000
W. B. Gleason,	Van Dyke's Brook,	Delhi,	Delaware,	5,000
Wm. Dart,	Second Lake,	Webb,	Herkimer,	15,000
Henry S. Miller,	Grassy Brook,	Boonville,	Oneida,	5,000
Inglehart & Brown,	Star Lake,	Fine,	St. Lawrence,	10,000
E. C. Aiken,	Nick's Pond,	Emilyville,	"	5,000
C. H. Wood,	Milton Hollow Creek,	Wheeler,	Steuben,	3,000
Lake George F. & G. Assn.,	Hague Brook,	Hague,	Warren,	15,000
A. G. Saxton,	Dart Brook,	Sherman,	Chautauqua,	5,000
A. A. Huntley,	Canasawasta Brook,	Pharsalia,	Chenango,	5,000
A. Fitzgerald,	Willowemoc River,	Rockland,	Sullivan,	10,000
Pleasantville R. & G. Club,	Mill River,	Mt. Pleasant,	Westchester,	8,000
Wm. A. McClellan,	Ramapo River,	Tuxedo,	Orange,	10,000
Edward Thompson,	Nissaquoque Stream,	Smithtown,	Suffolk,	30,000
C. F. Leland,	Spring Banks,	Schroon Lake,	Essex,	15,000

DISTRIBUTION OF BROOK TROUT FRY — CONTINUED.

NAME OF APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
Kelly Bros.,	Hubbell Hill Stream,	Middletown,	Delaware,	8,000
"	Bray Hollow Stream,	"	"	8,000
Nelson Fish & Game Assn.,	Several streams,	Nelson,	Madison,	10,000
C. H. Allen,	Shults Brook,	Ellenburg,	Clinton,	8,000
R. P. Towne,	Nigger Brook,	Franklin,	Franklin,	8,000
Seth Wardner,	Still Brook,	St. Armand,	Essex,	8,000
S. W. Barnard,	Grass Pond,	Bloomingdale,	"	10,000
David Helms,	South Pond,	Long Lake,	Hamilton,	15,000
E. Leroy,	Neversink River,	Fallsburgh,	Sullivan,	10,000
J. G. Stevens,	Steel Brook,	Rockland,	"	10,000
Henry Polhamus,	Willowemoc River,	De Bruce,	"	10,000
W. F. Durland,	Neversink River,	Fallsburg,	"	10,000
R. Magee,	Hare Brook,	Camden,	Oneida,	10,000
M. Schaefer,	Kane Brook,	Liberty,	Sullivan,	5,000
John Steffins,	Gregory Brook,	Neversink,	"	8,000
Joel Kimball,	Little Beaverkill Brook,	Liberty,	"	10,000
Bernard Garrety,	Esopus Creek,	Shandaken,	Ulster,	10,000
J. H. Risley,	The Chas. Bushkill,	"	"	8,000
B. Bissell,	Limestone Brook,	Carrollton,	Cattaraugus,	10,000
Maple City R. & G. Club,	Canisteo River,	Fremont,	Steuben,	10,000
The Fish & Game Assn.,	Skinner Creek,	Ellisburg,	Jefferson,	5,000
Isaac E. Hammer,	Barkaboom Creek,	Andes,	Delaware,	5,000
C. A. Norbury,	Smith Brook and others,	Wallkill,	Orange,	5,000
E. A. Gregory,	Mongaup Trout Stream,	Liberty	Sullivan,	8,000
A. G. St. John,	Campbell Brook,	Colchester,	Delaware,	10,000
A. G. Hall,	Dry Brook and others,	Hancock,	"	15,000
Walter Peak,	Trout Brook,	"	"	8,000

DISTRIBUTION OF BROOK TROUT FRY — CONTINUED.

NAME OF APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
Rockwell Sprague,	Beaverkill River,	Rockland,	Sullivan,	10,000
W. E. Sprague,	Trib. Beaverkill River,	"	"	15,000
E. R. Sprague,	" "	"	"	15,000
Chas. F. Voories,	Various brooks,	Hempstead,	Nassau,	8,000
Frank D. Parce,	Turner Brook,	Preston,	Chenango,	5,000
Francis Cantrell,	Private ponds,	Kings Park,	Suffolk,	5,000
H. S. Bulkley,	"	Odessa,	Schuyler,	56,000
J. W. Fletcher,	Cold Brook,	Franklin,	Franklin,	10,000
Lenape Lake Fishing Club,	Lenape Lake,	- - - - -	Sullivan,	60,000
J. Thomas Jones,	Jones Pond,	Huntington,	Suffolk,	5,000
Fisheries, Game and Forest Com.,	Hellgate Ponds,	Webb,	Herkimer,	10,000
" "	Eighth Lake,	Morehouse,	Hamilton,	10,000
" "	Seventh Lake,	"	"	10,000
" "	Moss Lake,	Webb,	Herkimer,	5,000
" "	Buds Lake,	"	"	5,000
" "	Twitchell Lake,	"	"	10,000
" "	Big Indian Sp. Brook,	"	"	10,000
" "	Joy Spring,	"	"	10,000
" "	Nicks Lake,	"	"	10,000
" "	Fay Brook,	Harrietstown,	Franklin,	5,000
" "	Sumner Brook,	"	"	5,000
" "	Church Pond,	Santa Clara,	"	5,000
" "	Hail Pond,	"	"	5,000
" "	Bone Pond,	"	"	5,000
" "	Little Clear Pond,	"	"	10,000
" "	St. Regis Pond,	"	"	10,000
" "	Slang Pond,	"	"	5,000

DISTRIBUTION OF BROOK TROUT FRY — CONTINUED.

NAME OF APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
Fisheries, Game and Forest Com.,	Two Bridges,	Harrietstown,	Franklin,	5,000
" "	Cherry Creek,	Lake Pleasant,	Hamilton,	10,000
" "	Elbow Creek,	Wells,	"	10,000
" "	Brown Creek,	Lake Pleasant,	"	10,000
" "	Hanley Creek,	Wells,	"	5,000
" "	Pumpkin Hollow Creek,	"	"	10,000
" "	Doig Creek,	Hope,	"	10,000
" "	Spy Lake,	Arietta,	"	5,000
" "	Little Rock Pond,	Wells,	"	5,000
" "	Little Round Pond,	Lake Pleasant,	"	5,000
" "	Inlet Pleasant Lake,	"	"	5,000
" "	Fawn Lake,	"	"	5,000
" "	Mill Creek,	"	"	10,000
" "	Big Clear Pond and Inlet,	Harrietstown,	Franklin,	20,000
" "	Jessup River,	Lake Pleasant,	Hamilton,	10,000
" "	Charley Lake,	Wells,	"	5,000
" "	Little Spring Brook,	Colchester,	Delaware,	10,000
J. M. Van Tassell,	Martellkill,	E. Fishkill,	Dutchess,	8,000
C. H. Mallock,	Peck and other brooks,	Delhi,	Delaware,	5,000
A. D. Burlingame,	Virgil Creek,	Virgil,	Cortland,	8,000
John Cashell,	Mill Neck Stream,	Mill Neck,	Nassau,	5,000

DISTRIBUTION OF BROOK TROUT FINGERLINGS.

NAME OF APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
Henry E. Miller,	Foxkill Creek,	Red Hook,	Dutchess,	300
Franklin Hanford,	Several streams,	Wheatland,	Monroe,	200
G. W. Rhodes,	Sanderskill,	Marbletown,	Ulster,	300
B. F. Vail,	Wawayanda Creek,	Warwick,	Orange,	500
S. Southard,	Bay Brook,	Greenport,	Columbia,	500
C. Hicks,	Clinton Corners Stream,	Clinton Corners,	Dutchess,	500
F. B. Reynolds,	Wiscoy Creek,	Pike,	Wyoming,	400
Chester McCaffrey,	High Lake,	St. Clara,	Franklin,	1,000
Henry Hilton,	Salmon River,	Redfield,	Oswego,	4,000
B. B. Sayer,	Wisner Brook,	Warwick,	Orange,	400
J. E. Board,	Cold Spring Stream,	Bloomingrove,	"	300
Mason M. Swan,	Jacobs Creek,	Rutland,	Jefferson,	1,000
Luke McHenry,	Canaseraga Creek,	Sullivan,	Madison,	800
Wm. E. Ames,	Branch Unadilla River,	Winfield,	Herkimer,	500
E. B. Salmon,	G. Lake Outlet,	Arietta,	Hamilton,	1,500
Edward Ham,	Willow Brook and others,	Stanford,	Dutchess,	500
Delos Axtell,	Cold Spring Brook,	Deposit,	Delaware,	1,000
S. Stevenson,	French's Brook,	Franklin,	Franklin,	500
F. R. Bain,	Ten Mile River,	Dover,	Dutchess,	500
E. N. Hurlburt,	Bronx River,	Kensico,	Westchester,	400
Geo. W. Cooper,	Willowemoc Stream,	Rockland,	Sullivan,	2,000
Warren Mann,	Townsend Brook,	Parishville,	St. Lawrence,	1,000
Fisheries, Game and Forest Com.,	Summer Stream,	Arietta,	Hamilton,	2,000
" "	Fourth Lake,	Webb,	Herkimer,	3,000
" "	Eighth Lake,	Morehouse,	Hamilton,	2,000
" "	Seventh Lake,	"	"	2,000
" "	Big Moose Lake,	Webb,	Herkimer,	2,000

DISTRIBUTION OF BROOK TROUT FINGERLINGS — CONTINUED.

NAME OF APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
Fisheries, Game and Forest Com.,	Johns Lake,	Webb,	Herkimer,	500
" "	Buds Lake,	"	"	500
" "	Moss Lake,	"	"	500
" "	Bug Lake,	"	"	500
" "	Lake North,	"	"	2,000
" "	Big Clear Pond,	Santa Clara,	Franklin,	5,000
" "	St. Regis Pond,	"	"	5,000
" "	Bone Pond,	"	"	1,000
" "	Little Clear Pond,	"	"	5,000
" "	Hoel Pond,	"	"	3,000
" "	Tribs. Fulton Chain Lakes,	Webb,	Herkimer,	1,200
John H. Tanner,	Cornell Creek,	Troupsburg,	Steuben,	500
D. I. Roberts,	Neversink River,	Guymard,	Orange,	300
"	Mountain Brook,	New City,	Rockland,	250
A. W. Gates,	Thomas Brook,	Victor,	Wayne,	300
A. G. Cropsey,	West Brook,	Clarkstown,	Rockland,	100
F. E. Hurden,	Goodline Lake,	Addison,	Steuben,	300
S. A. Redway,	Jordan River,	Kildare,	St. Lawrence,	1,000
J. P. Allds,	Dark Hollow Stream,	Sherburne,	Chenango,	1,000
De Ruyter Sportsman's Club,	Tioughnioga River,	De Ruyter,	Madison,	4,000
A. N. Cheney,	Clendon Brook,	Queensbury,	Warren,	1,000
Fisheries, Game and Forest Com.,	Outlet Little Clear Pond,	Santa Clara,	Franklin,	700
" "	Lower St. Regis Lake,	Brighton,	"	2,000
" "	Lake Placid,	St. Armand,	Essex,	2,000
Kelly Bros.,	Brag Hollow Stream,	Middletown,	Delaware,	1,000
J. M. Wardner,	Rainbow Lake,	Franklin,	Franklin,	1,000
G. S. Brantingham,	Big Indian Stream,	Oliveria,	Ulster,	1,500

DISTRIBUTION OF BROOK TROUT FINGERLINGS—CONTINUED.

NAME OF APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
J. E. Irish,	Chazy Lake,	Dannemora,	Clinton,	1,500
Fisheries, Game and Forest Com.,	Summer Stream,	Arietta,	Hamilton,	2,000
J. S. Kirby,	Chateaugay Lower Lake,	Belmont,	Franklin,	2,000
W. D. Ball,	Wilna Creek,	Wilna,	Jefferson,	1,000
Frank J. Worden,	Little Black Creek,	Russia,	Herkimer,	1,000
Anglers' Association,	Nine Mile Creek,	Camillus,	Onondaga,	1,500
"	Fabius Brooks,	Fabius,	"	1,500
"	Butternut Creek,	La Fayette,	"	1,000
H. H. Wheeler,	East Branch Unadilla River,	Winfield,	Herkimer,	3,000
Edwin Kingsley,	Rock City Creek,	Great Valley,	Cattaraugus,	500
"	Bouvey Creek,	Red House,	"	2,000
"	Christian Creek,	Great Valley,	"	2,000
"	Breed Run Creek,	West Salamanca,	"	500
"	Buck Tooth Run Creek,	"	"	2,000
W. H. Knickerbacker,	Crooks Stream,	Milton,	Saratoga,	1,000
F. D. Kilburn,	Indian Lake,	Belmont,	Franklin,	2,000
Burt E. Langdon,	East Coy Creek,	Wethersfield,	Wyoming,	1,000
J. W. Hutten,	Upper Chateaugay Lake,	Lyon Mountain,	Clinton,	2,500
E. O. Eldridge,	East Branch Owego Creek,	Berkshire,	Tioga,	3,000
Fred L. Hurds,	Fern Lake,	Black Brook,	Clinton,	1,000
Parish Fish and Game Assn.,	Little Salmon Creek,	Parish,	Oswego,	4,000
F. T. Huxley,	Evans Stream,	Providence,	Saratoga,	500
Royal G. Haskell,	Trout Brook,	Malone,	Franklin,	1,000
B. B. Sayer,	Wisner Brook,	Warwick,	Orange,	500
L. Will,	Crandall Brook,	Constantia,	Oswego,	1,200
Arcade R. & G. Club,	Waterman Brook,	Arcade,	Wyoming,	1,000
H. J. Fuller,	Wolfe Creek,	Portage,	Livingston,	1,000

DISTRIBUTION OF BROOK TROUT FINGERLINGS — CONTINUED.

NAME OF APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
M. J. Goff,	Indian Lake,	Belmont,	Franklin,	1,000
H. F. Titus,	Lyon Brook,	Bloomingdale,	"	500
Chas. Stack,	Burton Brook,	Dover,	Dutchess,	2,000
J. J. Lewis,	Cincenatta Creek,	Trenton,	Oneida,	3,000
L. P. Norton,	Seven Mile Creek,	Tully,	Cortland,	2,000
E. C. Harvey,	Allard Brook,	Georgetown,	Madison,	1,000
Dr. Wallace Bardeen,	Willow Brook,	(Not given),	"	2,000
Harry D. Cornell,	Knap Hollow,	Hillsdale,	Columbia,	1,000
Francis Garrison,	Turnpike Streams,	Plattekill,	Ulster,	1,000
W. J. Jones,	Scriba Creek,	Constantia,	Oswego,	800
M. L. Sanford,	Warwick Creek,	Warwick,	Orange,	1,000
Byron Maxson,	Coold Brook,	Scott,	Cortland,	3,000
H. F. Whittenhall,	Wheeler Brook,	Greene,	Chenango,	3,000
Carlos Hutchins,	Round Lake,	Indian Lake,	Hamilton,	3,000
G. S. Van Gorder,	Wiscoy Creek,	Pike,	Wyoming,	1,500
A. R. Muller,	Tioughnioga River,	Truxton,	Cortland,	1,000
Amos A. Smith,	Neversink River,	Neversink,	Sullivan,	1,000
Fisheries, Game and Forest Com.,	Spring Brook,	Rockland,	"	4,700
Clarence A. Farnum,	Genesee River,	Wellsville,	Allegany,	2,000
Olean Sportsman Club,	Wood Chuck Hollow,	Olean,	Cattaraugus,	2,000
Will H. Ferris,	Ischua Creek,	Machias,	"	500
J. S. Underhill,	Punch Bowl Spring,	Rockland,	Sullivan,	300
G. W. Cooper,	Willowemoc Stream,	"	"	5,000
Chas. B. Howe,	Lake Titus,	Malone,	Franklin,	500
Daniel Scanlin,	Clark Creek,	Diana,	Lewis,	1,000
E. C. Aiken,	Cranberry Lake,	Emeryville,	St. Lawrence,	1,500
Geo. H. Bancroft,	"	Clifton,	"	2,000

DISTRIBUTION OF BROOK TROUT FINGERLINGS — CONCLUDED.

NAME OF APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
J. E. Waterman,	Schenevus Creek,	Worcester,	Otsego,	1,000
H. G. Wilson,	Beers Creek,	Danby,	Tompkins,	1,000
A. H. Fowler,	Van Gelder's Creek,	"	"	1,000
Stanton Gillett,	Trout Creek,	Tompkins,	Delaware,	1,500
J. C. Gray,	Tioughnioga River,	Preble,	Cortland,	1,000
A. L. Martin,	Otsdana Creek,	Otego,	Otsego,	1,000
Chas. F. Voories,	Three Cedar Swamp,	Hempstead,	Nassau,	1,000
Z. B. Whitney,	Parsons Creek,	Johnstown,	Fulton,	500
J. Fred Haas,	Various streams,	Several towns,	Jefferson,	1,500
Albert S. Barker,	Coly Creek,	Orwell,	Oswego,	1,000
H. E. Lewis,	Headwaters Little River,	Amboy,	"	1,000
L. J. Myers,	Cowasselon Creek,	Lenox,	Madison,	1,000
A. J. Bennett,	Sulphur Springs Brook,	Parish,	Oswego,	500
F. L. Cunningham,	Mill Stream,	Cazenovia,	Madison,	1,000
Chas. Weeks,	Two Mile Stream,	Canajoharie,	Montgomery,	800
F. S. Skelton,	Twitchell Lake,	Webb,	Herkimer,	1,000
F. J. Shattuck,	Cherry Creek,	Cherry Creek,	Chautauqua,	800
Mannsville F. & G. Assn.,	Skinner Creek,	Mannsville,	Jefferson,	800
Jared Mallory,	Little Bay Creek,	Hastings,	Oswego,	600

DISTRIBUTION OF BROOK TROUT YEARLINGS.

NAME OF APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
L. R. Smith,	Fingar Stream,	Gallatin,	Columbia,	100
H. B. Vedder,	Spaulding Brook,	"	"	100
M. J. Wheeler,	Roeliff Jansenkill,	"	"	500
Olean Sportsman's Club,	Nine and Ten Mile Streams,	Olean,	Cattaraugus,	300
A. H. Fowler,	Six Mile Creek,	Caroline,	Tompkins,	200
M. W. Moseley,	Owlkill Stream,	White Creek,	Washington,	300
"	Whipple Brook,	Cambridge,	"	200
G. S. Van Gorder,	Wiscoy Creek,	Eagle,	Wyoming,	200
C. A. Cline,	Webotuck Creek,	Northeast,	Dutchess,	400
M. B. Fuller,	Broad Brook,	Bedford,	Westchester,	400
Thomas Oakley,	Pine Swamp Brook,	Yonkers,	"	300
A. L. Cronenberg,	Troublesome Brook,	Tuckahoe,	"	300
S. E. Thurton,	Grassy Spring Brook,	Yonkers,	"	300
M. H. Brasted,	Hunt's Brook,	Bronxville,	"	300
Fred Henoder,	Hutchinson Creek,	New Rochelle,	"	300
F. T. Huxley,	Steele Creek,	Providence,	Fulton,	500
"	Black Creek,	Broadalbin,	"	500
Wm. V. Pulver,	Ancram Stream,	Ancram,	Columbia,	500
A. Elliott,	Bronx River,	Scarsdale,	Westchester,	300
H. Witthoft,	West Branch Delaware River,	Bloomville,	Delaware,	400
Herman Bussey,	Shin Creek,	Rockland,	Sullivan,	500
H. Hoefer,	Sawmill River,	Nepera Park,	Westchester,	400
Groton F. & G. Club,	Fall Creek,	Groton,	Tompkins,	150
Otsego Fish Assn.,	Lower Red Creek,	Otsego,	Otsego,	500
Otto Voight,	Voigt's Lake,	Manor,	Suffolk,	100
Frank B. Potter,	White Brook,	Chester,	Warren,	500
Kelly Bros.,	Hubbell Hill Stream,	Middletown,	Delaware,	500

DISTRIBUTION OF BROOK TROUT YEARLINGS — CONTINUED.

NAME OF APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
Chas. H. Duell,	Huckleberry Mill,	Horicon,	Essex,	400
J. R. Hogan,	Pine Pond,	Harrietstown,	Franklin,	500
A. S. Branch,	"	"	"	1,000
T. J. Hallowell,	Croton Lake,	Kitchawan,	Westchester,	200
M. T. Bailey,	Dolan Brook,	Hunter,	Greene,	400
Geo. W. Cooper,	Willowemoc River,	De Bruce,	Sullivan,	300
Fisheries, Game and Forest Com.,	Cranberry Lake,	Colton,	St. Lawrence,	900
U. S. Grant Cure,	Birch Creek,	Pine Hill,	Ulster,	200
W. J. Watson,	Grout Creek,	Homer,	Cortland,	200
E. Sawyer,	Upper Chateaugay Lake,	Lyon Mountain,	Clinton,	200
Dr. H. P. Wilcox,	Big Bay Creek, North Branch,	West Monroe,	Oswego,	200
C. A. Schubert,	Pascock Stream,	Clarkson,	Rockland,	200
L. P. Cole,	Manorkill Creek,	Conesville,	Schoharie,	100
F. J. Weyl and P. W. Mitchell,	Delaware River,	Roxbury,	Delaware,	300
Frank E. Kuran,	Batavia Kill,	Windham,	Greene,	100
O. H. Clark,	Branch Croton River,	Croton Falls,	Westchester,	100
Henry McArthur,	Snyders Brook,	Ancram,	Columbia,	100
Palen Pulver,	Westfall Brook,	"	"	100
D. Kisselbrook,	Roeliff Jansenkill,	"	"	300
I. W. Shepherdson,	Pleasant Brook,	Smyrna,	Chenango,	400
W. B. Martin,	Warner and Bushkill,	Stony Clove,	Ulster,	300
C. H. Duell,	Rackett Pond and brooks,	Horicon,	Warren,	400
B. F. Harris, Secy.,	Harris Creek,	Lincklaen,	Chenango,	200
C. H. Weidner,	Bushkill,	Olive,	Ulster,	300
W. W. Aldrich,	Mill North and Kibby Creek,	Johnsburg,	Warren,	400
M. C. Bailey,	Fall Creek,	Dryden,	Tompkins,	100
L. Turner,	Hilliard Brook,	Schuyler Falls,	Clinton,	100

DISTRIBUTION OF BROOK TROUT YEARLINGS — CONTINUED.

NAME OF APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
W. A. Smythe,	Owego Creek,	Owego,	Tioga,	100
S. K. Jones, Secy.,	Holleybeck and other streams,	Cortland,	Cortland,	400
W. R. Lee,	Swamp and Croton Rivers,	Pawling,	Dutchess,	500
T. B. Hills,	Delaware River,	Middletown,	Delaware,	300
I. S. Smith,	Wawayanda Creek,	Warwick,	Orange,	100
A. J. Fellows, Secy.,	Indian and Pulver streams,	Chatham,	Columbia,	300
P. A. Hoysradt,	Spring Brook,	Ancram,	"	500
Virgil Palen,	Rondout Creek,	Wawarsing,	Ulster,	200
Frank Fleming,	Wawayanda & Brandners Brooks,	Warwick,	Orange,	200
W. C. Eager,	Lake Front Reservoir and Creek,	"	"	200
C. A. Cline,	Webotuck Stream and tribs.,	North East,	Dutchess,	100
W. C. Preston, Secy.,	Sickles Stream,	Woodstock,	Ulster,	300
"	Bushkill Creek,	Olive,	"	300
"	Snyder Hollow Creek,	Shandaken,	"	300
"	Little Shandaken Creek,	Woodstock,	"	300
"	Birch Creek,	Shandaken,	"	200
J. O. Spelman,	Hill, Burke & Fowler Streams,	Mendon,	Monroe,	200
Edwin Kingsley,	Bee Hunter Creek,	Red House,	Cattaraugus,	300
"	Stoddard Creek,	"	"	300
A. S. Tallman,	Wawarsie-Hill Creek,	Hopewell,	Dutchess,	200
A. V. Smith,	Daly Creek,	South East,	Putnam,	200
"	Drew Brook,	"	"	200
Lewis Weinman,	Wallington, Potter & other lks.,	Warrensburg,	Warren,	200
Wm. Casey,	Casey's Brook,	Columbus,	Chenango,	200
E. P. Hasselbeck, Secy.,	Pleasant & Kershan Brooks,	Sherburne,	"	300
W. J. Wheeler,	Roeliff Jansenkill,	Gallatin,	Columbia,	200
J. H. Hoysradt,	Belcher's Stream,	Ancram,	"	400

DISTRIBUTION OF BROOK TROUT YEARLINGS — CONTINUED.

APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
Geo. G. Tilman,	E. Branch Mongaup Stream,	Thompson,	Sullivan,	300
Howard Tillotson,	W. Branch Mongaup Stream,	Bethel,	"	400
W. C. Edmonston,	Cliffords Brooks,	Phelps,	Ontario,	200
John Murty,	Croton River tribs.,	Patterson,	Putnam,	200
A. L. Kerr,	Katterskill and Little and Middle Creeks,	Hunter,	Greene,	100
Geo. A. Stoddard,	No name,	Ulster,	Ulster,	100
Ed. Blass,	Bryant Spring Brook,	Ancram,	Columbia,	100
George Dart,	Stony Brook,	Ramapo,	Rockland,	100
H. F. Pulver,	Punch Brook,	Pine Plains,	Columbia,	200
Geo. Hyde,	Honey Meadow and Wappinger Creeks,	Stanford,	Dutchess,	100
G. S. Brantingham,	Big Indian Stream,	Oliverea,	Ulster,	500
J. W. Holt,	Cattail Stream,	Rockland,	Sullivan,	200
G. W. Fredericks,	Greycourt Stream,	Chester,	Orange,	500
Edw. Ham,	Willow & Barnard's Stream,	Stanford,	Dutchess,	300
H. D. Waite,	Little Hoosic and tribs.,	Berlin,	Rensselaer,	200
H. B. Althof, Prest.,	Stone, Nichols & Higgins Bks.,	Freedom,	Cattaraugus,	300
Wm. Von Der Linden,	Falkill Stream,	Rhinebeck,	Dutchess,	500
R. K. Mulford,	Lyons Brook,	Bedford,	Westchester,	200
D. I. Roberts, G. P. A.,	Shinglekill,	Port Jervis,	Orange,	500
" "	Cuddybock Brook,	"	"	500
" "	Clove Brook,	"	"	500
" "	Shad Pound Brook,	Deposit,	Delaware,	500
D. A. Sharpe,	Delaware River & tribs.,	Hobart,	"	100
Abram Smith,	Roeliff Jansenkill tribs.,	Gallatin,	Columbia,	100
C. M. Woolsey,	Willowemoc,	Rockland,	Sullivan,	500

DISTRIBUTION OF BROOK TROUT YEARLINGS — CONTINUED.

APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
A. J. Thompson,	Cherry Valley Creek & tribs.,	Cherry Valley,	Otsego,	200
E. A. Dox,	Cobleskill and tribs.,	Richmondville,	Schoharie,	100
W. H. Bartlett,	Ham Brook,	Pine Plains,	Dutchess,	200
F. W. Ketner,	Green River,	Austerlitz,	Columbia,	300
H. B. Hunter,	Esopus Creek & feeders,	Shandaken,	Ulster,	100
L. F. Bennett,	East Branch Neversink River,	Denning,	"	200
A. M. Warner,	Disbrow & Bassett Brooks,	Harpersfield,	Delaware,	200
F. B. Van West,	White Lake & Horseshoe Pond,	Bethel,	Sullivan,	300
J. E. Leonard,	Oswego Creek & tribs.,	Richford,	Cortland,	100
F. J. Fine,	Mayer Creek,	Litchfield,	Herkimer,	200
J. E. Pond,	Trout Pond,	Crown Point,	Essex,	200
"	Brother Pond,	"	"	300
J. H. Earts,	East Branch Neversink River,	Denning,	Ulster,	200
W. S. Nesbit,	Odello Brook,	Kortright,	Delaware,	100
Wm. Rutherford,	Trout Brook,	Potsdam,	St. Lawrence,	100
W. H. Averill,	South Branch Spring Creek,	Richland,	Oswego,	200
L. McGrath,	Gulf Stream & tribs.,	Liberty,	Sullivan,	300
W. R. Woolsey,	Willowemoc & tribs.,	Rockland,	"	500
G. W. Harris,	Butts-Hollow & Tower Hill Bks.,	Amenia,	Dutchess,	100
W. B. Mersereau,	Soup Creek,	Olean,	Cattaraugus,	500
J. C. Cornish,	Kline Creek,	Gardiner,	Ulster,	100
John Wilson,	Gulf Stream tributaries,	Liberty,	Sullivan,	300
F. J. Barker,	Roberts Hollow Stream,	Kortright,	Delaware,	200
Thos. Rich,	Township Brook,	Stamford,	"	300
"	Rose's Brook,	"	"	400
Fred Draper,	Cypher's, Cooper's & Whalley Brooks,	Beekman,	Dutchess,	100

DISTRIBUTION OF BROOK TROUT YEARLINGS — CONTINUED.

APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
H. P. Sweet,	Roeliff Jansenkill,	Austerlitz,	Columbia,	200
Gilbert Langdon,	Bulls Spring,	Copake,	"	200
Williard Holsapple,	Roeliff Jansenkill,	"	"	200
J. D. Bell,	Roeliff Jansenkill & tribs.,	"	"	200
W. D Streeter,	Salmon River,	Richland,	Oswego,	200
E. R. Eaton,	Trout Pond,	Crown Point,	Essex,	300
"	Brothers Ponds,	"	"	200
E. E. Fard,	Otego, Puleout & Charlotte Cks.,	Davenport,	Delaware,	200
Carl Tripp,	Br. Roeliff Jansenkill,	Gallatin,	Columbia,	100
H. D. Cornell,	Green River,	Austerlitz,	"	300
Storm Emans,	Silver Stream,	East Fishkill,	Dutchess,	200
W. A. Ross,	Springside Spring Stream,	Union Vale,	"	100
E. Love,	Clove Creek,	"	"	100
Geo. Lasher,	Gardner Hollow Creek,	Beekman,	"	100
O. C. Stowell,	Castor Creek,	Orwell,	Oswego,	100
W. J. Werfelman,	Peel's Brook,	Manlius,	Onondaga,	300
J. W. Kellar,	Willowemoc Stream,	Rockland,	Sullivan,	300
W. O. Ensign,	" "	"	"	500
C. S. McLoughlin,	Grizle Ocean Stream,	Ticonderoga,	Essex,	400
Albert Weed,	Trout Brook,	"	"	200
H. A. Stark,	Gt. Chazy River,	Altona,	Clinton,	100
J. W. Stark,	Sample Brook,	"	"	100
H. L. Stark,	Smithwood Brook,	"	"	100
Highland Falls R. & G. Club,	Po Po Lapen and 2 Pond Strms.,	Highland,	Orange,	200
W. G. Cattle,	Brown Meadow Brook,	Elbridge,	Onondaga,	500
D. I. Roberts, G. P. A.,	Pascock Brook,	Spring Valley,	Rockland,	300
D. J. Pierce,	Mongaup Creek,	Lumberland,	Sullivan,	500

DISTRIBUTION OF BROOK TROUT YEARLINGS — CONTINUED.

APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
T. M. Costello,	Penoyer, Rech & Blakewon Bks.,	Albion,	Oswego,	800
H. P. Dowe,	Allen Brook,	Pawling,	Dutchess,	200
D. Fitz Gerald,	Willowemoc and tribs.,	Rockland,	Sullivan,	500
F. S. Harris,	Wahwah & Wanamaker Strms.,	Ramapo,	Rockland,	100
Wm. Gardiner,	North Branch,	Callicoon,	Sullivan,	200
Walter Robisch,	"	"	"	200
J. H. Wagner,	"	"	"	200
S. F. Howland,	No name,	Bedford,	Westchester,	100
C. A. Ball,	Coal Brook and Groves River,	Wellsville,	Allegany,	400
C. A. Farnam,	Fords Brook and Ore Bed,	"	"	400
C. S. Thornton,	Mongaup River,	Thompson,	Sullivan,	500
James Carden,	Beaden and Taylor Brooks,	Fallsburgh,	"	500
A. D. Burlingame,	Virgil Creek,	Virgil,	Cortland,	100
J. G. Stevens,	Steel and Hardenburgh Brooks,	Rockland,	Sullivan,	500
M. Schaefer,	Kane and Krum Brooks,	Liberty,	"	200
Joel Kimball,	Little Bromkill & Brandy Bks.,	"	"	300
Bernard Garriety,	Esopus Creek and tribs.,	Shandaken,	Ulster,	500
J. H. Risely,	The Charles Bushkill,	"	"	100
Chas. Herring,	East & West Coy & other bks.,	Walton,	Delaware,	500
M. W. Marvin,	East and Marvins Brooks,	"	"	500
B. G. North,	Carrs and West Brooks,	"	"	500
G. P. Beers,	Third and Beers Brooks,	"	"	500
F. B. Wilber,	Carver Creek, E. & W. branches,	Sidney,	"	400
J. W. Shepherdson,	Ackley Creek,	Smyrna,	Chenango,	400
W. L. Elmer,	Bennett Creek and tribs.,	Masonville,	Delaware,	400
John Cashow,	Mill Neck Stream,	Mill Neck,	Nassau,	200
F., G. & F. Com.,	Beaverkill River,	Rockland,	Sullivan,	2,000

DISTRIBUTION OF BROOK TROUT YEARLINGS — CONCLUDED.

NAME OF APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
W. E. Walcott, Secy.,	Shenandoah & Oriskany Crks.,	Augusta,	Oneida,	200
T. H. Pursell,	Silver Lake Outlet,	"	Hamilton,	600
F., G. & F. Com.,	Willowemoc River,	Rockland,	Sullivan,	3,000
"	Beaverkill River,	"	"	4,660
C. M. Stonley,	Munson, Hardscrabble & O. Brooks,	Cazenovia,	Madison,	200
Jacob Rice,	Stern Raupe Lake and Spring Streams,	Kingston,	Ulster,	200
F., G. & F. Com.,	East and West Brooks,	Walton,	Delaware,	400
B. Howes,	Wiscoy Creek, W. branch,	Eagle,	Wyoming,	500

DISTRIBUTION OF BROOK TROUT 2 TO 5 YEARS OLD.

NAME OF APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
F., G. & F. Com.,	State Fair, Syracuse,	Syracuse,	Onondaga,	22
"	Lake Pleasant,	Lake Pleasant,	Hamilton,	175
"	Sacandaga Lake,	"	"	100

DISTRIBUTION OF BROWN TROUT FRY.

NAME OF APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
M. F. Hoctor,	Ham Brook,	Pine Plains,	Dutchess,	5,000
W. D. Snell,	Big Brook tributaries,	Worth,	Jefferson,	10,000
De Ruyter S. Club,	Tioughnioga River,	De Ruyter,	Madison,	20,000
E. H. Westbrook,	Canadice Lake,	Canadice,	Ontario,	1,000
Otsego F. & G. Assn.,	Red Creek and others,	Middlefield,	Otsego,	20,000
Lewis Fleeshman,	Bushkill,	Middletown,	Delaware,	5,000
Geneganslet F. & G. Assn.,	Geneganslet Creek,	Smithville,	Chenango,	20,000
Schuyler R. & G. Club,	Mill Brook,	Schaghticoke,	Rensselaer,	20,000
Arthur Boehm,	Stony Creek,	Hope,	Hamilton,	10,000
W. H. Lowyer,	Champlain,	Ellenburgh,	Clinton,	10,000
H. H. Eells,	Eells Brook,	Peru,	"	10,000
G. R. Heyworth,	Magee Brook,	"	"	10,000
H. E. Heyworth,	Henesey & Mason Brooks,	"	"	10,000
W. B. Weaver,	Barad & Clock Brooks,	"	"	10,000
J. Simpson,	Garbutt & Mill Ponds,	Wheatland,	Monroe,	5,000
I. M. Peck,	Basic Creek,	Westerlo,	Albany,	10,000
E. Stafford,	La Bounty Brook,	Ausable,	Clinton,	10,000
D. B. Cole,	Bushkill,	Middletown,	Delaware,	25,000
Sanford Bros.,	Plattekill,	"	"	25,000
W. Clark,	Chenango River tribs.,	Eaton,	Madison,	20,000
W. D. Ball,	Wilna Creek,	Wilna,	Jefferson,	5,000
E. Kelly,	Dry Brook,	Hardenburgh,	Ulster,	25,000
M. C. Daly,	North Lake,	Rockland,	Sullivan,	15,000
J. F. Lynch,	Miamus River,	Bedford,	Westchester,	5,000
A. M. Russell,	Chenango River,	Hamilton,	Madison,	20,000
A. S. Prime,	Mill and other creeks,	Jay,	Essex,	10,000
I. H. Wilson,	Days Brook,	Lockport,	Niagara,	5,000

DISTRIBUTION OF BROWN TROUT FRY — CONTINUED.

NAME OF APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
I. W. Wilson,	Pearsons Brook,	Newfane,	Niagara,	5,000
"	Shrimps Brook,	Hartland,	"	5,000
F. B. Reynolds,	Wiscoy and East Coy,	Genesee Falls,	Allegany,	10,000
H. L. Bulkley,	Private ponds,	Odessa,	Schuyler,	8,000
W. E. Walcott, Secy.,	Shenandoa Creek,	Augusta,	Oneida,	20,000
F., G. & F. Com.,	Joy & Spring Creek,	Webb,	Herkimer,	25,000
"	Grass Pond,	Santa Clara,	Franklin,	5,000
"	Little Long Pond,	"	"	10,000
"	Bear Pond,	"	"	10,000
"	Little Green Pond,	"	"	10,000
C. A. Tenant,	Thomas Brook,	Chenango,	Broome,	10,000
F., G. & F. Com.,	Moose River,	Webb,	Herkimer,	75,000
D. J. Daly, Secy.,	Canandaigua Lake,	Naples,	Ontario,	15,000
Z. L. Parker,	Goff's Creek,	Avoca,	Steuben,	15,000
C M. Stanley,	Munson and other creeks,	Cazenovia,	"	8,000
J. H Lamphere,	Sunderlin's Creek,	Sennett,	Cayuga,	10,000
C. A. McArthur,	Mountain Pond,	Brighton,	Franklin,	20,000
F., G. & F. Com.,	Dunning and other creeks,	Wells,	Hamilton,	5,000
"	Berry and other creeks,	Colchester,	Delaware,	8,000
"	Beaverkill and tribs.,	Rockland,	Sullivan,	6,000
A. L. Smith,	Fink's Stream,	Elma,	Erie,	10,000
F., G. & F. Com.,	Cold Spring Brook,	Urbana,	Steuben,	25,000
"	Spring Creek,	Caledonia,	Livingston,	12,000
I. O. Ballard,	Cold Brook,	Belmont,	Franklin,	10,000
Cassius Winch,	Conway and Winch Bks.,	Wilmington,	Essex,	10,000
D. H. Foote,	Sacandaga River,	Lake Pleasant,	Hamilton,	10,000
"	Oxbow Lake,	Arietta,	"	10,000

DISTRIBUTION OF BROWN TROUT FRY — CONTINUED.

NAME OF APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
Emerson Nye,	Fawn Stream,	Arietta,	Hamilton,	10,000
M. M. Cooper,	Marble Brook,	Wilmington,	Essex,	10,000
Edgar Sanders,	Dudley and other brooks,	Keene,	"	5,000
E. G. Hurlburt,	Bronx River,	Mt. Pleasant,	Westchester,	5,000
Chas. Rogers,	Oxbow Lake,	Arietta,	Hamilton,	10,000
I. L. Betts,	Price & Gate's Brook,	Georgetown,	Madison,	15,000
E. E. Bellings,	Schoharie Creek,	Gilboa,	Schoharie,	25,000
M. A. Shapley,	Hoppin's Reservoir,	Lebanon,	Madison,	10,000
D. I. Roberts,	Pearl River brooks,	Pearl River,	Rockland,	5,000
C. E. Sherman,	Charlotte Creek,	Davenport,	Delaware,	10,000
Cuba F. & G. Club,	Rawson Creek and tribs.,	Ischua,	Cattaraugus,	10,000
I. I. Hello,	Sowkill River,	Woodstock,	Ulster,	3,000
W. H. Mather,	Christie's Pond,	Caledonia,	Livingston,	5,000
A. J. Thompson,	Cherry Valley Creek,	Cherry Valley,	Otsego,	15,000
Warren Sprague,	McCollums and Spring Bk.,	Brighton,	Franklin,	10,000
C. A. McArthur,	" "	"	"	10,000
E. T. Reed,	Great Valley brooks,	Great Valley,	Cattaraugus,	10,000
Geo. E. Rice,	Little Beaverkill,	Parkville,	Sullivan,	20,000
I. G. Guthkill,	Ten Mile River and tribs.,	Tusten,	"	5,000
J. S Eells,	Arnold Stream,	Peru,	Clinton,	10,000
G. J. White,	Cooper and Catskill Creek,	Broome,	Schoharie,	10,000
W. S. Hagadorn,	No name,	Hector,	Schuyler,	5,000
M. T. Hodge,	Conklin and other brooks,	Neversink,	Sullivan,	15,000
C. B. Moffatt,	Sprout Creek,	Wappinger,	Dutchess,	2,000
Z. L. Parker,	Stocking Run and other cks.,	Cohocton,	Steuben,	50,000
J. H. Lamphere,	Sunderlin's Creek,	Sennett,	Cayuga,	10,000
C. M. Barrett,	Third Lake,	Webb,	Herkimer,	10,000
I. M. Bristol,	East Coy and Pike Brooks,	Gainesville,	Wyoming,	5,000

DISTRIBUTION OF BROWN TROUT FRY—CONCLUDED.

NAME OF APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
A. J. Dixon,	Butternut Creek,	Butternut,	Otsego,	15,000
W. N. Courtney,	Piseco Lake,	Arietta,	Hamilton,	5,000
J. D. Marley,	Sacandaga Lake,	Lake Pleasant,	"	10,000
J. W. Kirklane,	Cold Spring,	Urbana,	Steuben,	10,000
E. C. Aiken,	Nix's Pond,	Emilyville,	St. Lawrence,	10,000
G. B. Rathbun,	Shadow Brook,	Springfield,	Otsego,	10,000
W. W. Mead,	Mead Pond,	Plattsburgh,	Clinton,	5,000
H. D. Hadley,	Ostrander Brook,	"	"	10,000
G. G. McAdams,	Canada Creek,	Rome,	Oneida,	15,000
W. Smith,	Platteskill Creek,	Saugerties,	Ulster,	20,000
A. E. Jackson,	West Brook,	Walton,	Delaware,	10,000
B. W. Leroy,	Neversink River,	Neversink,	Sullivan,	15,000
E. R. Grant,	"	"	"	15,000
James Bownell,	"	"	"	15,000
E S. Jilson,	No name,	Nelson,	Madison,	15,000
Geo. Tharpe,	Otselic Creek,	Georgetown,	"	10,000
F., G. & F. Com.,	Spring Creek,	Wheatland,	Monroe,	25,000
"	Oatka,	"	"	20,000
"	McKay Pond,	Caledonia,	Livingston,	20,000
I. H. Benedict,	Oriskany Creek,	Sangerfield,	Oneida,	10,000
C. H. Mellock,	Peek and other creeks,	Delhi,	Delaware,	20,000
W. B. Gleason,	Girvin Dyke and others,	"	"	20,000
F. A. Fenderson,	Mulholland and Erwin Creeks,		Steuben,	5,000
James Ryan,	Limestone Creeks,	Pompey,	Onondaga,	10,000
G. R. Huested,	Skinner and other creeks,	Ellisburg,	Jefferson,	5,000
J. E. Heumer,	Barkaboom and Deerlick,	Andes,	Delaware,	5,000
C. A. Norbury,	Nance and other creeks,	Wallkill,	Sullivan,	10,000
E. A. Gregory,	Mongaup,	Bethel,	"	10,000

DISTRIBUTION OF BROWN TROUT YEARLINGS.

NAME OF APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
H. C. Allen,	Otselic Creek,	Georgetown,	Madison,	1,000
Lincklaen Sporting Club,	Davis Creek,	Lincklaen,	Chenango,	400
J. F. Lynch,	Miamus River,	Bedford,	Westchester,	300
Virgil Palen,	Rondout Creek,	Wawarsing,	Ulster,	400
Frank Dunning,	Bradner's Brook,	Warwick,	Orange,	100
M. C. Eager,	Lake Trout Reservoir,	"	"	100
Black River S. & G. Assn.,	North Lake,	Wilmurt,	Herkimer,	2,000
Edwin Kingsley,	Big Red House Creek,	Red House,	Cattaraugus,	500
"	Bear Hollow Creek,	Gt. Valley,	"	500
"	Upper Big Red House Creek,	Red House,	"	500
H. Van De Mark,	Lowrey Pond,	Junius,	Seneca,	25
P. A. Gaffney,	Spring Branch,	Java,	Wyoming,	500
E. G. Hurlbut,	Bronx River,	Mt. Pleasant,	Westchester,	200
B. P. Wayne,	Casper Creek,	Poughkeepsie,	Dutchess,	100
E. E. Bulling,	Schoharie Creek and tribs.,	Gilboa,	Schoharie,	200
A. L. Emans,	Shenandoa and Gayhead Cks.,	East Fishkill,	Dutchess,	100
D. I. Roberts,	Woodbury Creek,	Woodbury,	Orange,	500
"	Highland Mill Creek,	Highland Mills,	"	500
"	Shinhollow Brook,	Port Jervis,	"	500
"	Stony Brook,	Highland,	Sullivan,	500
"	Halfway Brook,	"	"	500
"	Beaver Brook,	"	"	500
"	Little Mill Brook,	"	"	500
"	Adams Brook,	Long Eddy,	"	500
"	Peck's Brook,	"	"	500
"	Basket Brook,	"	"	500
"	Cold Spring Brook,	Deposit,	Delaware,	500

DISTRIBUTION OF BROWN TROUT YEARLINGS — CONTINUED.

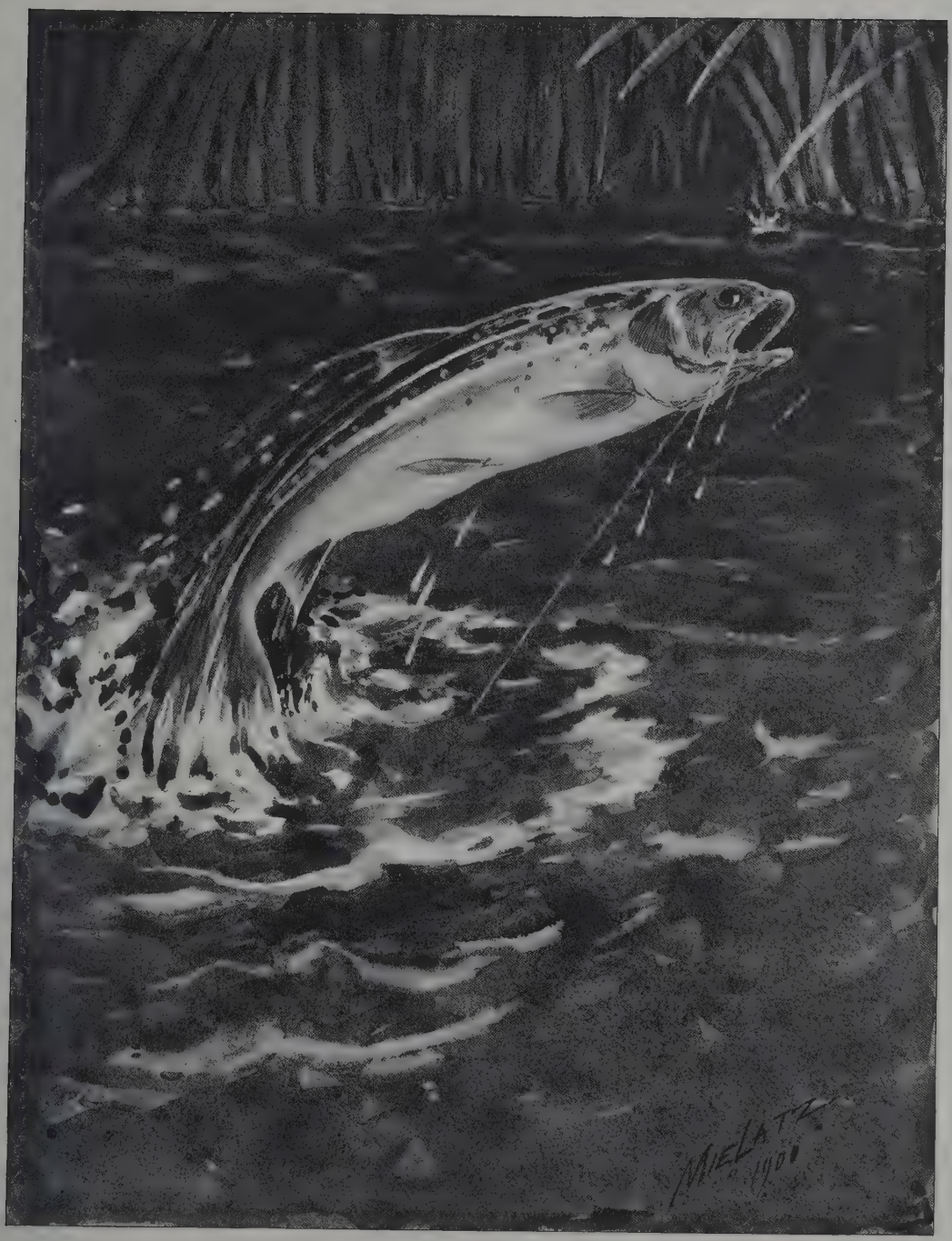
NAME OF APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
D. I. Roberts,	Mahwah Creek,	Suffern,	Rockland,	500
G. C. Davis,	Silvia Lake,	Fowler,	St. Lawrence,	500
C. E. Sherman,	Charlotte Creek,	Davenport,	Delaware,	200
W. H. Walker,	Christies Pond,	Caledonia,	Livingston,	200
F. J. Pine,	Moyer Creek,	Litchfield,	Herkimer,	600
F. C. Edmunds,	Kline Creek,	Gardner,	Ulster,	200
G. F. White,	Cooper & Catskill Creeks,	Broome,	Schoharie,	200
W. S. Hagadorn,	No name,	Hector,	Schuyler,	200
C. B. Molfort,	Sprout Creek,	Wappinger,	Dutchess,	100
A. A. Beardsley,	Farrington Creek,	Constantia,	Oswego,	1,000
Z. L. Parker,	Stocking Run,	Cohocton,	Steuben,	2,000
J. H. Lamphere,	Sunderlin Creek,	Sennett,	Cayuga,	400
F. C. McGown,	Gillie Brook,	Elbridge,	Onondaga,	500
E. A. Tomkins,	Winter's Brook,	Mt. Hope,	Orange,	500
H. C. Benson,	Beaver Brook,	"	"	500
C. F. Bennett,	Little Shawangunk,	Wallkill,	"	500
Lewis Roth,	Shawangunk,	"	"	1,000
J. E. Gibbs,	Benewater Brook,	Greenville,	"	500
C. L. Ellwood,	Tuthill Brook,	Wallkill,	"	500
E. M. Van Duzer,	Winter's Brook,	Mt. Hope,	"	500
A. T. Bertholt,	Little Shawangunk,	Wallkill,	"	500
J. Milton,	Baxter Brook,	Mt. Hope,	"	1,000
L. D. Roberson,	Paughcaughnaughsinque,	Crawford,	"	500
C. Highan,	Beaver Brook,	Mt. Hope,	"	500
J. M. Bristol,	Eastkoy & Pike,	Gainesville,	Wyoming,	500
J. Hyland,	Canaseraga Creek,	Dansville,	Livingston,	500
Danville F. & G. Assn.,	Van Doron Creek and trib.,	"	"	500

DISTRIBUTION OF BROWN TROUT YEARLINGS — CONTINUED.

NAME OF APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
H. G. Lee,	Mongaup Creek,	Lumberland,	Orange,	500
C. H. Lee,	Bushkill Creek,	Deer Park,	"	500
G. B. Rathbun,	Sadow Brook,	Springfield,	Otsego,	300
Edwin Marshall,	Reed's Brook,	Rhinebeck,	Dutchess,	350
Geo. Thorp,	Otselic Creek,	Georgetown,	Madison,	300
G. H. Benedict,	Oriskany Creek,	Sangerfield,	Oneida,	500
J. F. Van De Cook,	Platner and other streams,	Delhi,	Delaware,	1,200
C. A. Ball,	Cool Brook and other streams,	Wellsville,	Allegany,	600
C. A. Farnum,	Ford's Brook & Orbed,	"	"	600
H. G. Wilson,	Krum Creek,	Enfield,	Tompkins,	500
Jas. Ryan,	Limestone Creek,	Pompey,	Onondaga,	200
F. S. Davis, Secy.,	Canisteo River,	Hornellsville,	Steuben,	1,000
G. R. Huested,	Skinner and other creeks,	Ellisburgh,	Jefferson,	100
J. O. Bryere,	Racquette Lake,	Long Lake,	Hamilton,	1,000
W. E. Wolcott, Secy.,	Oriskany Creek,	Augusta,	Oneida,	400
C. A. Tennant,	Thomas Brook,	Chenango,	Broome,	300
H. C. Higginson,	Fishkill Creek,	Fishkill,	Dutchess,	500
F., G. & F. Com.,	Spring Creek,	Wheatland,	Monroe,	9,616
"	Cold Spring Brook,	Urbana,	Steuben,	1,500
"	Fountain Ponds,	Bath,	"	6
"	Syracuse Exhibition,	Syracuse,	Onondaga,	21
Perry Loucks,	Spring Brook,	Pine Plains & Stanford,	Dutchess,	500
W. W Aldrich,	Sianes Pond,	Johnsburg,	Warren,	2,000
Willard F. Inman,	Volkeskill & Sawmill Pond,	Schodack,	Rensselaer,	300
J. H. Shepard,	Riverside Cemetery,	Greece,	Monroe,	200
F., G. & F. Com.,	Spring Creek,	Mumford,	"	2,446
D. J. Roberts,	Wildcat Brook,	Tuxedo,	Orange,	400

DISTRIBUTION OF BROWN TROUT YEARLINGS — CONCLUDED.

NAME OF APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
D. J. Roberts,	Little Shawangunk,	Middletown,	Orange,	700
"	Highland Mill Creek,	Highland,	"	800
J. P. Allds,	Canasawatca Creek,	Plymouth,	Chenango,	200
De Ruyter Sport. Club,	Tioughnioga,	De Ruyter,	Madison,	1,000
H. Hooper,	Saw Mill River & Lake,	Nepera Park,	Westchester,	400
Otto Voight,	Voight's Lake,	Manor,	Suffolk,	200
C. W. Rundle,	Straw Mill Creek,	Odessa,	Schuyler,	500
C. B. Potter,	White & other brooks,	Chester,	Warren,	1,500
C. A. Duell,	Huckleberry Mill Creek,	Horicon & Schroon,	"	600
T. J. Hallowell,	Croton Lake and trib.,	Kitchawan,	Westchester,	100
M. F. Bailey,	Dolan, Broom & others,	Hunter,	Greene,	400
F., G. & F. Com.,	Cranberry Lake,	Clifton,	St. Lawrence,	2,500
"	Church & French Ponds,	Colton,	"	3,000
W. H. Manning,	Bog Meadow & Slade Creeks,	Greenfield,	Saratoga,	500
F., G. & F. Com.,	Big Tupper Lk. & Simons Pond,	Hopkinton,	St. Lawrence,	1,000
Schuyler R. & G. Club,	Mill Brook,	Schaghticoke,	Rensselaer,	300
W. J. Watson,	Grout Creek,	Homer,	Cortland,	800
Peter Flint,	Buck Mount. Pond,	Ticonderoga,	Essex,	400
C A. Schubert,	Paseack Stream,	Ramapo,	Rockland,	200
J. Simpson,	Garbut & Mill Ponds,	Wheatland,	Monroe,	100
W. H. Shear,	Onesquthan Creek,	Coeymans & Bethlehem,	Albany,	300
"	Hannecroix Creek,	Greene & Westerlo,	"	500
M. W. Smith,	Croton River,	Putnam,	Westchester,	200
W. Neeling,	Belcher Brook,	Ancram,	Columbia,	300



A CLEAN BREAK.

DISTRIBUTION OF BROWN TROUT FINGERLINGS.

NAME OF APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
G. H. Bancroft,	Cranberry Lake,	Clifton,	St. Lawrence,	2,500
D. I. Roberts, G. P. A.,	Stony Brook,	Highland,	Sullivan,	1,000
"	Halfway Brook,	"	"	1,000
"	Beaver Brook,	"	"	1,000
"	Little Mill Brook,		"	1,000
"	Tyler's Brook,	Cochecton,	"	1,000
"	Peck's Brook,	Long Eddy,	"	1,000
"	Adams Brook,	"	"	1,000
"	Basket Brook,	"	"	2,000
"	Knight's Brook,	Stockport,	Delaware,	1,000
"	Cold Spring Brook,	Deposit,	"	1,000
"	Rood's Creek,	"	"	1,000
"	Mahwah Creek,	Suffern,	Rockland,	1,000
"	Van Houten Creek,	Clarkstown,	"	500
"	Garber Spring Creek,	"	"	500
"	Mountain brooks,	New City,	"	500
"	Pearl River,	Pearl River,	"	500
"	Wild Cat Brook,	Tuxedo,	Orange,	1,000
"	Highland Mill Brook,	Highland Mills,	"	500
"	Ridge Brook,	"	"	500
"	Woodbury Brook,	Woodbury,	"	500
J. E. Waterman,	Schenevus Creek,	Worcester,	Otsego,	1,000
J. C. Gray,	Tioughnioga River,	Preble,	Cortland,	1,000
Z. B. Whitney,	Parsons and other creeks,	Mayfield,	Fulton,	1,500
F., G. & F. Com.,	Sacandaga River,	Wells,	Hamilton,	15,000
M. T. Russell, Secy.,	Beaver Meadow and others,	Hartwick,	Oswego,	3,500
E. Kingsley, Secy.,	Big Red House Creek,	Red House,	Cattaraugus,	2,500

DISTRIBUTION OF BROWN TROUT FINGERLINGS — CONTINUED.

NAME OF APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
F. B. Reynolds,	East and Wiscoy Creek,	Hume and Pike,	Wyo. & Allegany,	500
Kelly Bros.,	Wawaka Lake,	Halcottsville,	Delaware,	1,500
Catskill F. & G. Club,	Catskill Creek,	Catskill,	Greene,	1,000
F. B. Baine,	Ten Mile River and Brooks,	Amenia,	Dutchess,	500
D. I. Roberts, G. P. A.,	Pine Kill,	Otisville,	Orange,	800
" "	Neversink River,	Guymard,	"	300
" "	Pearl River,	Pearl River,	Rockland,	700
" "	Mountain Brook,	New City,	"	350
" "	Cold Spring Brook,	Deposit,	Delaware,	1,000
" "	Knight's Creek,	Stockport,	"	1,000
A. J. Cropsey,	Stony Brook,	Charlestown,	Rockland,	500
F. E. Hurden,	Tuscarora Creek,	Tuscarora,	Steuben,	300
J. P. Allds.,	Canasawacta Creek,	Plymouth,	Chenango,	1,500
F., G. & F. Com.,	Skaneateles Lake,	Spafford,	Onondaga,	6,000
"	Lake Placid,	St. Armand,	Essex,	3,000
Ira Elmendorf,	Esopus Creek,	Olive,	Ulster,	500
F., G. & F. Com.,	Beaverkill River,	Colchester,	Delaware,	10,000
"	Osgood Lake,	Brighton,	Franklin,	2,000
Geneganslet F. & G. Assn.,	Geneganslet Creek,	Smithville,	Chenango,	1,000
W. W. Suits,	White Bottom Creek,	Eldridge,	Onondaga,	2,000
I. S. Kirby,	Chateaugay Lake,	Belmont,	Franklin,	2,500
F., G. & F. Com.,	Loon Lake,	Franklin,	"	3,750
"	Sumner Stream,	Arietta,	Hamilton,	1,250
J. B. Sampson,	Allen's Creek,	Leroy,	Genesee,	4,000
F. F. Huxley,	Evans and other creeks,	Providence,	Saratoga,	1,000
E. D. Keeney, Secy.,	Waterman Pond,	Arcade,	Wyoming,	1,000
Carlo Hutchins,	Round Lake,	Indian Lake,	Hamilton,	5,250

DISTRIBUTION OF BROWN TROUT FINGERLINGS — Concluded.

NAME OF APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
J. P. Allds,	Canasawacta Creek,	Norwich,	Chenango,	10,000
A. R. Muller,	Tioughnioga River,	Truxton,	Cortland,	3,000
A. A. Smith,	Neversink River,	Neversink,	Sullivan,	2,000
F., G. & F. Com.,	Beaverkill tribs.,	Rockland,	"	25,000
R. J. Quale,	Halfway Creek,	Hanover,	Chautauqua,	1,000
V. J. Wiltsee,	Otsdowa Creek,	Otego,	Otsego,	2,000
W. H. Phillips,	Several brooks,	Bath,	Steuben,	15,000
"	"	"	"	30,000
C. A. Farnum,	Genesee River,	Wellsville,	Allegany,	2,000
W. H. Ferris,	Ischua Creek,	Machias,	Cattaraugus,	3,400
C. F. Krein,	Canaseraga Lake,	Dansville,	Steuben,	3,000
A. S. Hill,	Spring Brook,	Riga,	Monroe,	500
C. B. Howe,	Lake Titus,	Malone,	Franklin,	1,000

DISTRIBUTION OF RAINBOW TROUT FRY.

NAME OF APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
E. A. Westbrook,	Canadice Lake,	Canadice,	Ontario,	1,000
I. J. Delo,	Sawkill River,	Woodstock,	Ulster,	3,000
Duck Derby,	Otis Pond,	Santa Clara,	Franklin,	10,000
P. J. Depanai,	No name,	Wawarsing,	Ulster,	5,000
Geo. Deyo,	So. Valley Stream,	"	"	5,000
F., G. & F. Com.,	Grass Pond,	Harriettstown,	Franklin,	5,000

DISTRIBUTION OF RAINBOW TROUT FRY — CONCLUDED.

NAME OF APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
F., G. & F. Com.,	Cold Pond,	Santa Clara,	Franklin,	15,000
"	Little Clear Pond,	"	"	10,000
"	Little Green Pond,	"	"	5,000
"	Little Clear Outlet,	"	"	3,000
"	Cold Spring Brook,	Urbana,	Steuben,	25,000

DISTRIBUTION OF RAINBOW TROUT FINGERLINGS.

NAME OF APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
C. Van Steinburgh,	Sawkill Creek,	Red Hook,	Dutchess,	500
J. W. Pond,	Ragged Lake,	Belmont,	Franklin,	1,750
G. W. Cooper,	Willowemoc,	Rockland,	Sullivan,	6,000
Delavan R. G. Club,	Cattaraugus Creek,	Yorkshire,	Cattaraugus,	3,000
Chas. Starck,	Ellis Pond,	Dover,	Dutchess,	1,500
E. Canada Lake Prot. Assn.,	E. Canada Lakes,	Caroga,	Fulton,	1,250
Sandy Hill F. & G. Club,	Fort Ann and other creeks,	Queensbury,	Warren,	3,000
C. St John,	Pine Kiln and Yankee Lake,	Mamakating,	Sullivan,	800
F., G. & F. Com.,	Keuka Lake,		Yates & Steuben,	22,000
S. R. Beardsley,	Paradox Lake,	Schroon,	Essex,	2,000
J. R. Hoadley,	Brantingham Lake,	Greig,	Lewis,	1,250
F. E. Hurden,	Goodhue Lake,	Tuscarora,	Steuben,	400
F., G. & F. Com.,	Spring Creek,	Caledonia,	Livingston,	3,000
"	Allen Creek,	Wheatland,	Monroe,	1,500

DISTRIBUTION OF RAINBOW TROUT FINGERLINGS — CONTINUED.

NAME OF APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
Geo. W. Cushman,	Lake Titus,	Malone,	Franklin,	1,000
A. Mather,	Mendon Ponds,	Mendon,	Monroe,	1,250
L. A. Shutt, Secy.,	Brooks in town of Catskill,	Catskill,	Greene,	2,000
C. S Allen, Secy.,	Sly & Bessie Brooks,	West Fort Ann,	Washington,	2,000
J. P. Allds,	Chenango Lake,	New Berlin,	Chenango,	1,500
F., G. & F. Com.,	Hemlock Lake,	No town,	Livingston,	1,875
"	Big Moose Lake,	Webb,	Herkimer,	3,125
"	Skaneateles Lake,	Spafford,	Onondaga,	5,000
"	Lake Placid,	St. Armand,	Essex,	2,500
Kelly Bros.,	Brag Hollow Brook,	Middletown,	Delaware,	1,000
F., G. & F. Com.,	Fulton Chain Lakes,	Webb,	Herkimer,	5,000
"	Asgood Lake,	Brighton,	Franklin,	2,000
Geneganslet F. & G. Assn.,	Brag Pond,	Smithville,	Chenango,	1,000
J. S. Kirby,	Chateaugay Lake,	Belmont,	Franklin,	3,000
F., G. & F. Com.,	Hemlock Lake,	Lavonia,	Livingston,	11,250
"	Loon Lake,	Franklin,	Franklin,	2,000
"	Big Moose Lake,	Webb,	Herkimer,	2,000
J. P. Sampson,	Allen's Creek,	Le Roy,	Genesee,	3,000
F. T. Huxley,	Evans and other streams,	Providence,	Saratoga,	1,000
E. D. Keeney, Secy.,	Waterman Pond,	Arcade,	Wyoming,	2,000
A. A. Smith,	Neversink River,	Neversink,	Sullivan,	2,000
M. H. Ferris,	Ischua Creek,	Machias,	Cattaraugus,	4,000
J. Hyland,	Mill Creek and trib.,	Dansville,	Livingston,	3,000
F., G. & F. Com.,	Fulton Chain,	Webb,	Herkimer,	20,000
"	Big Moose Lake,	"	"	15,000
"	Keuka Lake,		Yates,	10,000
"	Fulton Chain,	Webb,	Herkimer,	10,000

DISTRIBUTION OF RAINBOW TROUT FINGERLINGS—Concluded.

NAME OF APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
F., G. & F. Com.,	Lake George and trib.,	Caldwell,	Warren,	5,625
"	Hoel Pond,	Santa Clara,	Franklin,	6,000
"	Hemlock Lake,	Livonia,	Livingston,	10,000
"	Upper Chateaugay Lake,	Dannemora,	Clinton,	5,000
C. B. Howe,	Lake Titus,	Malone,	Franklin,	1,000
Dan Scanlon,	Clark and Cammel creeks,	Diana,	Lewis,	2,000
E. C. Aiken,	Cranberry Lake Inlet,	Emilyville,	St. Lawrence,	3,000
E. D. Keeney,	Cattaraugus Creek,	No town,	Wyoming,	3,000
F. J. Shattuck,	Cherry Creek,	Cherry Creek,	Chautauqua,	1,200
F., G. & F. Com.,	Big Clear Lake,	Harriettstown,	Franklin,	16,875

DISTRIBUTION OF RAINBOW TROUT YEARLINGS.

NAME OF APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
F. Ashhoff,	Galway Lake,	Galway,	Saratoga,	600
N. Bailey,	Clear Pond,	Chestertown,	Warren,	1,000
D. I. Roberts,	Ramapo River,	Tuxedo,	Orange,	400
"	Shawangunk Kiln,	Middletown,	"	800
H. Hoefer,	Saw Mill River,	Nepera Park,	Westchester,	600
Jared Mallory,	Little Bay & Shanty Creek,	West Manor,	Oswego,	800
Otto Voigt,	Voight's Lake,	Manor,	Suffolk,	200
Chas. H. Wright,	Lake Kentuck,	Oyster Bay,	Queens,	800
Chas. H. Duell,	Brant Lake,	Horicon,	Warren,	1,000

DISTRIBUTION OF RAINBOW TROUT YEARLINGS — CONTINUED.

NAME OF APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
D. B. Gray,	Atea Creek,	Wheatland,	Monroe,	1,000
C. Hicks,	Upton Lake,	Clinton,	Dutchess,	500
T. J. Hallowell,	Croton Lake,	Kitchawan,	Westchester,	100
S. T. Horton,	Indian Lake,	Putnam Valley,	Putnam,	500
F., G. & F. Com.,	Cranberry Lake,	Clifton,	St. Lawrence,	2,000
"	Lake Bonaparte,	Diana,	Lewis,	1,000
"	Church & French Ponds,	Hopkinton,	St. Lawrence,	4,000
W. H. Manning,	Bog Meadow & Slade Creek,	Saratoga,	Saratoga,	500
F., G. & F. Com.,	Big Tupper Lake,	Hopkinton,	St. Lawrence,	2,000
C. M. Bartlett,	Kanesha Lake,	Monticello,	Sullivan,	1,000
Chas. Stark,	Little Whaley,	Pauling,	Dutchess,	800
W. A Wells,	Sprout Creek,	La Grange,	"	600
Peter Flint,	Buck Mountain Pond,	Ticonderoga,	Essex,	400
H. Hewett,	Crystal Spring Lake,	Rocksburg,	Delaware,	500
G. V. Norton,	Stony Lake,	Watson,	Lewis,	600
F. E. Kurean,	Batavia and other streams,	Windom,	Greene,	400
M. W. Smith,	W. B. Croton,	Putnam,	Westchester,	300
M. N. Van Allen,	White Lake,	White Lake,	Sullivan,	3,000
H. C. Porter,	Roeliff Jansenkill,	Ancram,	Columbia,	500
Seth Hubbard,	Tolls Hollow,	Conesville,	Schoharie,	500
W. D. Ball,	Wilna Creek,	Wilna,	Jefferson,	1,000
V. R. Merrinan,	Esopus Creek,	Olive,	Ulster,	500
T. A. Purdy,	Beaver Brook,	North Salem,	Westchester,	500
D. G. Helmes,	South and Clear Ponds,	Long Lake,	Hamilton,	2,000
Henry Van De Mark,	Lowrey Pond,	Junius,	Seneca,	50
Frank Ackert,	Sprout Creek,	Union Vail,	Dutchess,	300
Geo. A. Dykeman,	Catterskill Creek,	Catskill,	Greene,	600

11

DISTRIBUTION OF RAINBOW TROUT YEARLINGS — CONTINUED.

NAME OF APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
Chas. Van Steinburg,	Sawkill Creek,	Red Hook,	Dutchess,	300
M. Hazen,	Croton River,	Kent,	Putnam,	500
J. W. Hutten,	Upper Chateaugay Lake,	Lion Mountain,	Clinton,	1,500
D. C. Davis,	Silvia Lake,	Fowler,	St. Lawrence,	500
J. F. Olive, Secy.,	Rawson Creek and trib.,	Cuba,	Allegany,	800
Geo. W. Smith,	Jansenkill,	Livingston,	Columbia,	500
C. A. Montfort,	Wappinger Creek,	Wappinger,	Dutchess,	300
J. J. Crookston,	Klinekill,	Gardner,	Ulster,	400
Little Valley F. & G. Assn.,	Cattaraugus Creek,	Otto,	Cattaraugus,	500
H. R. Bryan,	Lake Charlotte,	Gallatin,	Columbia,	500
Geo. F. Bailey,	Meadow and Brown Brooks,	Hunter,	Greene,	500
W. B. Mershereau,	Weymouth Creek,	Olean,	Cattaraugus,	500
Rev. Jas. Meagher,	Cazenovia Lake,	Cazenovia,	Madison,	1,500
F. J. Barker,	Roberts Hollow Brook,	Kortright,	Delaware,	400
Henry Delamater,	Bronx and Hollister Lake,	Coxsackie,	Greene,	400
Arby Rowley,	Griffin's Creek,	Cuba,	Allegany,	300
John Hyland,	Canaseraga Creek,	Dansville,	Livingston,	1,000
Highland Falls R. & G. Club,	Streams in,	Highland,	Orange,	800
Dansville F. & G. Assn.,	Van Deroo and other creeks,	Dansville,	Livingston,	1,000
C. H. Lee,	Bushkill,	Deer Park,	Orange,	500
F., G. & F. Com.,	Fulton Chain,	Webb,	Herkimer,	10,000
"	Keuka Lake,	No town,	Steuben,	30,000
Wm. Smith, Secy.,	Platte Creek and trib.,	Saugerties,	Utster,	500
J. E. B. Santee,	Loon Lake,	Wayland,	Steuben,	800
M. Winters,	Gleason, Graham & other bks.,	Delhi,	Delaware,	1,200
J. J. Lewis,	Steuben and Canada Creeks,	Trenton,	Oneida,	1,000
P. J. Deponai,	No name,	Wawarsing,	Ulster,	300

DISTRIBUTION OF RAINBOW TROUT YEARLINGS — CONCLUDED.

NAME OF APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
Geo. Deyo,	South Valley,	Warwarsing,	Ulster,	300
Frank S. Harris,	Wahwah and other streams,	Ramapo,	Rockland,	400
S. F. Howland,	No name,	Bedford,	Westchester,	100
Wm. Dart,	Second Lake,	Webb,	Herkimer,	1,000
Abel Crook,	Brant Lake,	Horicon,	Warren,	500
Herbert G. Wilson,	Enfield Creek,	Enfield,	Tompkins,	500
D. B. Wilbur,	Carver Creek,	Sidney,	Delaware,	100
F. S. Davis, Secy.,	Canisteo River,	Hornellsville,	Steuben,	1,500
J. O. Bryere,	Racquette Lake and tribs.,	Long Lake,	Hamilton,	1,000
F., G. & F. Com.,	Big Clear Pond,	Harrietstown,	Franklin,	1,500
"	Little Clear Pond,	Santa Clara,	"	2,500
"	Hoel Pond,	"	"	1,500
"	Hemlock Lake,	Springwater,	Livingston,	16,500
"	"	No town,	"	2,740
"	First Lake,	Webb,	Herkimer,	1,200
"	Spring Creek,	Wheatland,	Monroe,	300
"	Fountain Ponds,	Soldiers' Home, Bath,	Steuben,	6
"	Willowemoc River,	Rockland,	Sullivan,	2,300
Jacob Rice,	Stearn Raup Lake & springs,	Kingston,	Ulster,	800
F., G. & F. Com.,	Osgood Lake,	Brighton,	Franklin,	2,500
"	Big Clear Lake,	Harrietstown,	"	3,400
"	Spring Creek,	Caledonia,	Livingston,	1,326
"	State Fair Exhibit,	Syracuse,	Onondaga,	18

DISTRIBUTION OF LAKE TROUT FRY.

NAME OF APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
E. H. Westbrook,	Canadice Lake,	Canadice,	Ontario,	1,000
I. E. Irish,	Chazy Lake,	Dannemora,	Clinton,	25,000
Loon Lake Hotel Co.,	Loon Lake,	Franklin,	Franklin,	20,000
R. G. Davenport,	Kuce, Jamuck & other brooks,	Wells,	Hamilton,	20,000
W. Kenwell,	Squaw Lake & Michael Ponds,	Moorehouse,	"	10,000
N. Ossont,	Independence & other creeks,	Middletown,	Delaware,	5,000
J. A. Bryere,	Racquette Lake,	Long Lake,	Hamilton,	20,000
W. Chase,	Rich & Harris Lakes,	Newcomb,	Essex,	10,000
D. H. Foote,	Lake Pleasant,	Lake Pleasant,	Hamilton,	10,000
C. F. Hulser,	White & Long Lakes,	Forestport,	Oneida,	10,000
I. W. Wardner,	Rainbow Lake & trib.,	Franklin,	Franklin,	20,000
Isaiah A. Wood,	Fourth Lake,	Webb,	Herkimer,	10,000
"	"	"	"	40,000
Orin Dunning,	Gilman Lake,	Lake Pleasant,	Hamilton,	15,000
I. H. Lamphere,	Owasco,	Owasco,	Cayuga,	40,000
I. H. Parsons,	Fourth Lake,	Webb,	Herkimer,	10,000
C. M. Barrett,	Third Lake,	"	"	15,000
Aug. Avery,	Loomis Lake,	Arietta,	Hamilton,	10,000
W. N. Courtney,	Piesco Lake,	"	"	10,000
J. D. Morley,	Sacandaga Lake,	Lake Pleasant,	"	10,000
Wm. Dart,	Second Lake,	Webb,	Herkimer,	20,000
C. F. Leland,	Schroon & Paradox Lakes,	Schroon,	Essex,	25,000
E. M. White,	Moose Pond,	Bloomingdale;	"	10,000
David Helms,	South & Clear Ponds,	Long Lake,	Hamilton,	15,000
F., G. & F. Com.,	Eighth Lake,	Moorehouse,	"	15,000
"	Seventh Lake,	"	"	15,000
"	Rat Pond,	Santa Clara,	Franklin,	15,000

DISTRIBUTION OF LAKE TROUT FRY — CONCLUDED.

NAME OF APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
F., G. & F. Com.,	Turtle Pond,	Santa Clara,	Franklin,	5,000
"	Hoel Pond,	"	"	15,000
"	Little Green,	"	"	5,000
"	St. Regis Pond,	"	"	20,000
"	Long Pond,	"	"	5,000
"	Big Clear Pond,	Harrietstown,	"	20,000
"	Upper Saranac Lake,	"	"	50,000

DISTRIBUTION OF LAKE TROUT FINGERLINGS.

NAME OF APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
C. T. Leland,	Schroon & Paradox Lakes,	Schroon,	Essex,	11,000
F., G. & F. Com.,	Hemlock Lake,		Livingston,	10,800
"	Hoel Pond & Lake Clear,	Santa Clara,	Franklin,	12,500
Frank Powley,	Lake Ontario,	Porter,	Niagara,	10,000
F., G. & F. Com.,	Keuka Lake,		Steuben,	12,875
"	Lower Saranac Lake,	Harrietstown,	Franklin,	11,550
"	Big Moose,	Webb,	Herkimer,	8,625
"	Skaneateles Lake,	Spofford,	Onondaga,	13,200
H. W. Watrous,	Lake George,		Warren,	10,000
F., G. & F. Com.,	Lake Placid,	St. Armand,	Essex,	6,600
"	Fulton Chain,	Webb,	Herkimer,	5,000
"	Upper St. Regis Lake,	Brighton,	Franklin,	5,000

DISTRIBUTION OF LAKE TROUT FINGERLINGS — CONCLUDED.

NAME OF APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
I. S. Kirby,	Chateaugay Lake,	Belmont,	Franklin,	5,000
F., G. & F. Com.,	Loon Lake,	Franklin,	"	5,000
"	Big Moose Lake,	Webb,	Herkimer,	3,000
"	Upper Saranac Lake,	Santa Clara,	Franklin,	5,000
"	Hemlock Lake,	Livonia,	Livingston,	20,000
"	Canandaigua Lake,		Ontario,	20,000
"	Skaneateles Lake,		Onondaga,	20,000
"	Little Clear Lake,	Santa Clara,	Franklin,	20,000
"	Keuka Lake,		Yates,	15,000
"	Fulton Chain Lake,	Webb,	Herkimer,	17,000
"	Loon Lake,	Franklin,	Franklin,	20,000
"	Lower Saranac Lake,	Harrietstown,	"	20,000
"	Lake Placid,	North Elba,	Essex,	20,000
"	Big Moose Lake,	Webb,	Herkimer,	9,000
"	Fulton Chain Lakes, 1, 3, 4,	"	"	9,000
"	Lake George & tribs.,	Caldwell,	Warren,	20,625
"	Hoel Pond,	Santa Clara,	Franklin,	10,500
"	Upper Chateaugay,	Dannemora,	Clinton,	7,000
Daniel Scanlan,	Clark & Cammel creeks,	Diana,	Lewis,	5,000
F., G. & F. Com.,	Long Pond,	Santa Clara,	Franklin,	7,000
"	Upper Saranac Lake,	"	"	8,000
"	Lake Ontario,	Olcott,	Niagara,	14,000
"	Schroon Lake,	Schroon,	Essex,	7,000
"	Big Clear Lake,	Harrietstown,	Franklin,	3,250
"	Keuka Lake,	Urbana,	Steuben,	10,000

DISTRIBUTION OF LAKE TROUT YEARLINGS.

NAME OF APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
W. W. Aldrich,	Siames Pond,	Johnsburgh,	Warren,	2,000
J. A. Emerson,	Schroon Lake,	Horicon,	"	1,000
C. H. Duell,	Brant Lake,	"	"	1,000
F., G. & F. Com.,	Lake Bonaparte,	Diana,	Lewis,	4,000
"	Big Tupper and Simonds Pond,	Hopkinton,	St. Lawrence,	5,000
C. J. Alexander, Agt.,	Lake Erie,	"	Chautauqua,	1,000
Peter Flint,	Buck Mt. and other ponds,	Ticonderoga,	Essex,	100
C. F. Wilson,	Lake Ontario,	Wilson,	Niagara,	3,600
D. G. Helms,	South and Clear Ponds,	Long Lake,	Hamilton,	6,000
I. W. Hutton,	Upper Chateaugay Lake,	Lyon Mountain,	Clinton,	1,000
I. N. Hayes,	Owasco Lake,	"	Cayuga,	800
Joseph Parker,	"	"	"	800
B. S. Townsend,	"	"	"	800
Victor Adams,	Fourth Lake,	Old Forge,	Herkimer,	1,000
F., G. & F. Com.,	Upper Saranac Lake,	Santa Clara,	Franklin,	4,500
J. O. A. Bryne,	Racquette Lake and trib.,	Long Lake,	Hamilton,	1,000
F., G. & F. Com.,	Hemlock Lake,	"	Livingston,	800
"	Canandaigua Lake,	"	Ontario,	6,413

DISTRIBUTION OF RED THROAT TROUT YEARLINGS.

NAME OF APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
F., G. & F. Com.,	Church and French Ponds,	Hopkinton,	St. Lawrence,	3,000
"	Big Tupper Lake,	"	"	2,000

DISTRIBUTION OF RED THROAT TROUT YEARLINGS — CONCLUDED.

NAME OF APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
D. G. Helms,	South and Clear Ponds,	Long Lake,	Hamilton,	2,000
F., G. & F. Com.,	Keuka Lake,	Hammondsport,	Steuben,	2,500
"	Upper Saranac Lake,	Santa Clara,	Franklin,	445
"	Big Clear Pond,	Harrietstown,	"	750
"	Little Clear Pond,	Santa Clara,	"	750
"	Hoel Pond,	"	"	1,500
"	First Lake,	Webb,	Herkimer,	3,750
"	Little Clear Pond,	Santa Clara,	Franklin,	13,351
"	Little Green Pond,	"	"	3,427
"	Hoel Pond,	"	"	2,000
"	Spring Creek Pond,	Wheatland,	Monroe,	10,000
"	Little Green Pond,	Santa Clara,	Franklin,	8,000

DISTRIBUTION OF RED THROAT TROUT FINGERLINGS.

NAME OF APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
F., G. & F. Com.,	Keuka Lake,		Yates,	5,300
"	Spring Creek,	Wheatland,	Monroe,	7,000
"	Osgood Lake,	Brighton,	Franklin,	1,000
"	Sumner Stream,	Arietta,	Hamilton,	2,000
"	Lake George and trib.,	Caldwell,	Warren,	11,500
"	Upper Chateaugay Lake,	Dannemora,	Clinton,	5,000

DISTRIBUTION OF RED THROAT TROUT 4 YEARS OLD.

NAME OF APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
F., G. & F. Com.,	State Fair Exhibit,	Syracuse,	Onondaga,	8

DISTRIBUTION OF RED THROAT TROUT EGGS.

NAME OF APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
U. S. Fish Com.,	Hatchery at,	Glen Lake, Maine,		10,000
"	S. Ioffe,	Rittergut, Germany,		10,000

DISTRIBUTION OF RED THROAT TROUT FRY.

NAME OF APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
F., G. & F. Com.,	Cold Spring Brook,	Urbana,	Steuben,	15,000

DISTRIBUTION OF PIKE.

NAME OF APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
C. A. Cline,	Indian and Rudd Pond,	North East,	Dutchess,	50,000
W. S. Thornton,	Sackett Lake,	Thompson,	Sullivan,	50,000
M. S. Northup,	E. Canada Lakes,	Caroga,	Fulton,	150,000
E. N. Chapman,	Schoharie Creek,	Esperance,	Schoharie,	50,000
Geo. B. Smith,	Chenango River,	- - - - - -	Ch'm'g & Steuben	500,000
D. I. Roberts,	Upper Hackensack River,	Clarkstown,	Rockland,	50,000
D. S. Mercereau,	Susquehanna River,	Union,	Broome,	200,000
E. Kingsley, Secy.,	Allegany River,	Salamanca,	Cattaraugus,	500,000
Wm. Cluehey,	Smith's Pond,	Howard,	Steuben,	100,000
Albert Crowell,	Wallkill River,	Shawangunk,	Ulster,	50,000
Fred. Bostwick,	Stissing Lake,	Pine Plains,	Dutchess,	50,000
E. P. Waddell,	Mohawk River,	Glenville,	Schenectady,	50,000
C. L. Parker,	Reservoir,	Onondaga,	Onondaga,	100,000
Wm. G. Penny,	Highland Lake,	Tioga & Montgomery,	Orange,	50,000
J. F. Stephens,	Long Lake,	Highland Falls,	"	100,000
D. T Bailey,	Wallkill River,	- - - - - -	"	50,000
A. J. Gilbert,	Honeoye Lake,	Richmond,	Ontario,	500,000
L. Roth,	Wallkill River,	- - - - - -	Orange,	50,000
T. N. Friend,	"	- - - - - -	"	50,000
J. F. Bradner,	"	- - - - - -	"	50,000
A. C. Nickenson,	"	- - - - - -	"	50,000
Geo. Hindsley,	Pleasant Lake,	Thompson,	Sullivan,	50,000
Olean S. Club,	River and creek	Olean,	Cattaraugus,	100,000
J. S. Burnett,	Otterkill,	Bloomingrove,	Orange,	50,000
J. H. Beamer,	Thompson Lake,	Knox,	Albany,	50,000
J. H. Brownell,	Susquehanna River,	Windsor,	Broome,	200,000
Andrew Bauer,	Tonawanda Creek,	Sheldon,	Wyoming,	50,000

DISTRIBUTION OF PIKE — CONTINUED.

NAME OF APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
J. F. Olive,	Cuba Lake,	Cuba,	Allegany,	300,000
R. G. Nichols,	Titus Lake,	Harpersfield,	Delaware,	50,000
J. W. Vealey,	Pohchoch Spring,	Warwick,	Orange,	50,000
J. S. Meagher,	Catanova Lake,	Catanova,	Madison,	500,000
E. L. Fish, Sec.,	Black Creek,	Bergen,	Genesee,	300,000
S. T. Suscho,	Susquehanna River,	Nichols,	Tioga,	300,000
E. G. Butler,	" "	Bainbridge,	Chenango,	200,000
Geneganslet F. & G. Bot.,	Bragg Pond,	Smithville,	"	200,000
F. G. & F. Com.,	Littleville Pond,		Ontario,	41
S. D. Horton,	Indian Lake,	Putnam Valley,	Putnam,	50,000
Schuyler B. & G. Club,	Hudson River,	Stillwater,	Saratoga,	200,000
H. W. Cornell,	Niagara "	Lewiston,	Niagara,	3,500,000
C. F. Wilson,	Lake Ontario,	Wilson,	"	2,500,000
H. C. Allen,	Hatches Lake,	Eaton,	Madison,	100,000
J. M. McArthur,	Murder Creek,	Darien,	Genesee,	100,000
W. B. Lee,	Lake Hammersley,	Pawling,	Dutchess,	50,000
C. Y. Fullington,	Grass River,	Canton,	St. Lawrence,	500,000
P. E. Blair,	Mohawk River,	Florida,	Montgomery,	500,000
J. E. Bierhardt, Sec.,	Oneida River,	Schroeppel,	Onondaga,	1,000,000
" "	Seneca River,	Van Buren,	"	1,000,000
" "	Jamesville Reservoir,	Manlius,	"	500,000
C. H. Babcock,	18 Mile Creek,	Newfane,	Niagara,	2,500,000
W. F. Ford,	Mohawk River,	Dunsbach Ferry,	Alb'y & Saratoga,	200,000
A. L. Wager,	Lepasco Lake,	Rhinebeck,	Dutchess,	50,000
E. Fyler,	Henderson Bay,	Hainsfield,	Jefferson,	500,000
A. H. Burtch,	Mohawk River,	Mohawk,	Montgomery,	200,000
Geo. W. Burrows,	" "	Little Falls,	Herkimer,	200,000

DISTRIBUTION OF PIKE — CONTINUED.

NAME OF APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
C. H. Waterman,	Murder Creek,	Pembroke,	Genesee,	100,000
H. P. Whitney,	Canandaigua Lake,	"	Wayne,	200,000
F. M. Douck,	Susquehanna River,	Colesville,	Broome,	200,000
E. L. Brown,	Tonawanda Creek,	Clarence,	Erie,	500,000
C. W. Pocknell & Co.,	Unadilla River,	Guilford,	Chenango,	100,000
D. J. Roberts, G. P. A.,	Summit Lake,	Monroe,	Orange,	100,000
"	Delaware River,	Lumberland,	Sullivan,	100,000
"	Montgomery Lake,	Highland,	"	100,000
"	Washington Lake,	"	"	100,000
"	Delaware River,	Fremont,	"	100,000
"	"	Delaware,	"	100,000
"	Lake Huntington,	Cochecton,	"	100,000
"	Delaware River,	"	"	100,000
"	"	Tusten,	"	100,000
"	Greenwood Lake,	Monroe,	Orange,	1,500,000
"	Twin Lake,	"	"	100,000
"	Cromwell Lake,	"	"	100,000
"	Delaware River,	Hancock,	Delaware,	100,000
"	"	"	"	100,000
F. Wilkinson,	Miller Pond,	Copake,	Columbia,	25,000
J. L. Hale,	Crooks Lake,	Scriba,	Oswego,	100,000
Hunter G. Club,	Oswego River,	Volney,	"	2,500,000
C. J. Miller,	18 Mile Creek,	Newfane,	Niagara,	250,000
J. Bromley,	Chenango River,	Binghamton,	Broome,	200,000
T. Watts,	Wallkill River,	Wallkill,	Orange,	50,000
A. Gunthier,	"	"	"	50,000
F. N. Barnes,	"	Goshen,	"	50,000

DISTRIBUTION OF PIKE — CONTINUED.

NAME OF APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
D. M. Dusenbury,	Wallkill River,	Wallkill,	Orange,	50,000
G. E. Brahams,	"	"	"	50,000
W. H. Brown,	"	Wawayanda,	"	50,000
J. E. Barnes,	"	Hamptonburgh,	"	50,000
H. M. Hayes,	"	"	"	50,000
L. W. Taft,	"	Montgomery,	"	50,000
J. Witkin,	Ketchum's Pond,	Mt. Hope,	"	25,000
H. E. Thompson,	"	"	"	25,000
L. G. Wilson,	Wood's Pond,	Wawayanda,	"	50,000
E. M. Van Anzer,	"	"	"	50,000
H. C. Benson,	Bennewater Pond,	Greenville,	"	25,000
J. Wilkin,	"	"	"	25,000
F. M. Hayes,	Oldroyd's Pond,	Mt. Hope,	"	25,000
F. A. Rockefellow,	"	"	"	25,000
G. H. Waite,	Chenango River,	Dickinson,	Broome,	200,000
J. A. Patterson,	Upper & L. Town Summit,	Woodbury,	Orange,	100,000
Genesee Co. G. Club,	Tonawanda River,	Batavia,	Genesee,	500,000
E. S. Gilson, Sec.,	Erieville Reservoir,	Nelson,	Madison,	200,000
D. Enders,	Schoharie River,	Esperance,	Schoharie,	100,000
J. A. Sullivan,	Racquette River,	Potsdam,	St. Lawrence,	500,000
Mohawk F. & G. Club,	Hudson River,	Waterford,	Saratoga,	500,000
E. White,	Clark's Lake,	Ancram,	Columbia,	25,000
A. Day,	Chrysler's Pond,	"	"	25,000
H. L. Miller,	Snyder's Pond,	Copake,	"	25,000
E. Knickerbocker,	Clark's Lake,	Ancram,	"	25,000
E. Blaso,	Lake Charlot,	Gallatinville,	"	25,000
B. Kisselbrack,	Upper Rhoda Stream,	Copake,	"	25,000

DISTRIBUTION OF PIKE—CONCLUDED.

NAME OF APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
H. McArthur,	Lower Rhoda Pond,	Ancram,	Columbia,	25,000
M. Neeling,	Long Pond,	"	"	25,000
"	Chrysler Pond,	"	"	25,000
T. H. Donnelly,	Silver Lake,	Castile,	Wyoming,	500,000
J. Gallagher,	Oneida Lake,	Constantia,	Oswego,	2,000,000
A. A. Beardsley,	"	"	"	1,000,000
R. H. Black,	"	"	"	1,000,000
J. E. Marsh,	"	"	"	1,000,000
R. L. Lindsey,	"	"	"	1,000,000
W. L. Eavitt,	Clyde River,	Lyons,	Wayne,	200,000
L. T. Beyer, Pres.,	Niagara River,	Buffalo,	Erie,	300,000
J. J. Sullivan,	Black River,	Brownville,	Jefferson,	100,000
A. J. Fellows, Sec.,	Lake Chatham,	Chatham,	Columbia,	25,000
G. P. Matterson, Pres.,	Oswego River,		Oswego,	4,000,000
M. E. Lins,	Panther Lake,	Constantia,	"	500,000
M. N. Smyth,	Susquehanna River,	Owego,	Tioga,	200,000
H. T. Commings,	Saratoga Lake,	Stillwater,	Saratoga,	150,000
F., G. & F. Com.,	Irondequoit Bay,	Irondequoit,	Monroe,	600,000
Horace E. McGuire, Pres.,	Conesus Lake,	Lakeville,	Livingston,	1,000,000
M. Doyle,	Braddock's Bay,	Greece,	Monroe,	500,000
F., G. & F. Com.,	Canandaigua Lake,	Canandaigua,	Ontario,	1,650,000
C. H. Babcock,	Littleville Pond,	Manchester,	"	450,000

DISTRIBUTION OF PIKE PERCH ADULT.

NAME OF APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
E. H. Westbrook,	Glenville Ponds,	Livonia,	Livingston,	48

DISTRIBUTION OF PIKE PERCH YEARLINGS.

NAME OF APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
C. H. Babcock,	Littleville Pond,	Manchester,	Ontario,	250
I. O. Sullivan,	Racquette River,	Potsdam,	St. Lawrence,	300
S. E. Filkins,	Oak Orchard Creek,	Shelby,	Orleans,	50

DISTRIBUTION OF BLACK BASS FRY.

NAME OF APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
C. T. Roper,	Wallkill River,	Hamtonburgh,	Orange,	600
D. W. Dusenbury,	Mohegan Lake,	Wallkill,	"	600
L. Roth,	"	"	"	600
I. E. Gibbs,	"	"	"	600
C. F. Walker,	"	"	"	600
I. Wilkin,	"	"	"	600
C. Higham,	Highland Lake,	"	"	600
E. W. Van Dusen,	"	"	"	600
A. E. Micherson,	"	"	"	600

DISTRIBUTION OF BLACK BASS FRY — CONTINUED.

NAME OF APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
E. M. Decker,	Highland Lake,	Wallkill,	Orange,	600
A. L. Decker,	"	"	"	600
L. G. Wilson,	Holroyd's Pond,	Mt. Hope,	"	600
G. E. Bramin,	"	"	"	600
F. Watts,	Brewerton Pond,	Greenville,	"	600
A. Gunther,	"	"	"	600
A. H. Pratt,	"	"	"	600
H. F. Curry,	Kanesha Lake,	Thompson,	Sullivan,	1,000
A. Brown,	Beaverkill,	Hurley,	Ulster,	1,000
L. B. Ruttenber,	E. & W. Mud Lakes,	Arkwright,	Chautauqua,	1,000
Geo. H. White,	Chenango River,	Chenango,	Broome,	3,000
R. H. Baker,	Madison Lake,	Madison,	Madison,	1,200
I. Post,	Pleasant Lake,	Bethel,	Sullivan,	2,000
Genesee Co. G. Club,	Tonawanda River,	Batavia,	Genesee,	2,100
I. W. Shepardson,	Earlville Lake,	Lebanon,	Madison,	1,200
E. Le Roy,	Kanesha Lake,	Thompson,	Sullivan,	1,000
T. Orr,	Mountain Lake,	Cornwall,	Orange,	1,200
T. H. Donnelly,	Silver Lake,	Castile,	Wyoming,	2,000
D. W. Bardsell,	Artist Lake,	Brookhaven,	Suffolk,	2,200
I. H. Loughrin,	Wallkill River,	Montgomery,	Orange,	1,400
Saugerties F. & G. Club,	Esopus Creek,	Saugerties,	Ulster,	2,100
W. A. Tapley,	Lebanon Reservoir,	Lebanon,	Madison,	2,100
C. E. Beecher,	Pocantico Lake,	Mt. Pleasant,	Westchester,	1,000
J. J. Sullivan,	Black River,	Mansfield,	Jefferson,	2,100
J. H. Maybee,	Clear Huckleberry Ponds,	Edwards,	St. Lawrence,	2,100
A. S. Whitney,	Chubb Pond,	Fowler,	"	2,100
Ulster Co. F. & G. Club,	Katrina Lake,	Ulster,	Ulster,	1,400
H. E. McGuire, Pres.,	Conesus Lake,		Livingston,	2,000

DISTRIBUTION OF BLACK BASS FRY — CONTINUED.

NAME OF APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
W. B. Jones,	Cazenovia Creek,	Aurora,	Erie,	1,000
A. L. Smith,	"	E. Aurora,	"	100
J. E. Gibbs,	Wallkill River,		Orange,	600
L. B. Bower,	" "		"	600
A. H. Pratt,	" "		"	600
E. M. Becker,	" "		"	600
Wm. Higham,	" "		"	600
Herman Otto,	" "		"	600
Gabe Tuthill,	Monhagen Lake,		"	600
I. F. Olive,	Ransom Creek,	Cuba,	Allegany,	1,200
I. M. Dee,	Hornby Lake,	Hornby,	Steuben,	1,200
E. L. Fisher, Secy.,	Black Creek,	Bergen,	Genesee,	2,100
W. D. Snell,	Lake Ontario,	Hounsfield,	Jefferson,	2,000
E. G. Butler,	Susquehanna River,	Bainbridge,	Chenango,	3,000
F., G. & F. Com.,	Littleville Pond,		Ontario,	6
I. W. Beebe,	Cassada Lake,	Stockton,	Chautauqua,	1,200
Schuyler R. & G. Club,	Hudson River,	Stillwater,	Saratoga,	3,200
Geo. E. Borst,	Schoharie River,	Middleburgh,	Schoharie	2,100
J. A. McArthur,	Murder Creek,	Darien,	Genesee,	3,300
P. E. Blaine,	Mohawk River,	Fonda,	Montgomery,	2,100
W. T. Ford,	" "	Dunsback's Ferry,	Albany,	2,100
J. N. Case,	Crystal Lake,	Rensselaerville,	"	1,400
N. D. Bortle,	Guilford Lake,	Guilford,	Chenango,	2,400
E. W. Ingraham,	Fridley's Lake,	Mina,	Chautauqua,	1,000
A. H. Burtch,	Mohawk River,	Mohawk,	Montgomery,	1,400
George H. Burrows,	" "	Little Falls,	Herkimer,	2,100
E. Ham,	Miller Pond,	Pine Plains,	Dutchess,	1,000

DISTRIBUTION OF BLACK BASS FRY — CONCLUDED.

NAME OF APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
H. D. Waite,	Kendall's Pond,	Berlin,	Rensselaer,	1,200
D. I. Roberts, G. P. A.,	Greenwood Lake,	Greenwood Lake,	Orange,	5,400
" "	Mt. Basha Lake,	Monroe,	"	2,100
" "	Walton Lake,	"	"	1,200
" "	Round Lake,	"	"	1,200
" "	Summit Lake,	Central Valley,	"	1,200
" "	Otterkill Creek,	Washingtonville,	"	1,200
" "	Oguaga Lake,	Deposit Lake,	"	1,200
" "	Washington Lake,	Booneville,	Sullivan,	1,200
" "	Huntington Lake,	Cochecton,	"	1,200
" "	Kenoza Lake,	Callicoon,	"	1,200
H. B. Whitney,	Canandaigua Lake,		Wayne,	1,200
H. D. Thompson,	Wallkill River,	Wallkill,	Orange,	600
H. M. Hayes,	" "	"	"	600
F. A. Rockefellow,	" "	Wawayanda,	"	600
I. B. Giles,	" "	Goshen,	"	600
J. Rice,	Stern Rape Lake,	Kingston,	Ulster,	2,100
Erie Preserving Co.,	Park Lake,	Brant,	Erie,	1,000
Michael Doyle,	Braddock's Bay,	Greece,	Monroe,	2,000
Mohawk R. & G. Club,	Mohawk River,	Waterford,	Saratoga,	3,200
F., G. & F. Com.,	Irondequoit Bay,	Irondequoit,	Monroe,	6,000
"	Littleville Pond,	Manchester,	Ontario,	3,500
F. P. Hazelton,	Lime Lake,	Machias,	Cattaraugus,	2,000
S. E. Filkins,	Oak Orchard Creek,	Shelby,	Orleans,	2,000
W. F. Keeler,	Jennings Pond,	Palermo,	Oswego,	2,000
B. P. Grant,	Catfish Pond,	Clayton,	Jefferson,	3,000

DISTRIBUTION OF BLACK BASS YEARLINGS.

NAME OF APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
Lincklaen F. & G. Club,	Davis Pond,	Lincklaen,	Chenango,	100
Erieville F. & G. Club,	Erieville Reservoir,	Nelson,	Madison,	100
I. S. Traubman,	Railroad Lake,	Oneida,	"	100
G. W. Sargent,	Panther Lake,	Constantia,	Oswego,	100
A. J. Johnson,		Irondequoit,	Monroe,	100

DISTRIBUTION OF BLACK BASS ADULTS.

NAME OF APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
F., G. & F. Com.,	Orange Lake,	Newburgh,	Orange,	159
"	Esopus Creek,	Esopus,	Ulster,	152
"	Orange Lake,	Newburgh,	Orange,	564

DISTRIBUTION OF FROST FISH.

NAME OF APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
J. M. Wardner,	Rainbow Lake,	Franklin,	Franklin,	200,000
N. Ossant,	Crystal Lake,	Watson,	Lewis,	25,000
E. L. Morrison,	Lumber Lake,	Arietta,	Hamilton,	25,000

DISTRIBUTION OF FROST FISH — CONCLUDED.

NAME OF APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
F., G. & F. Com.,	Lake Placid,	St. Armand,	Essex,	400,000
"	Upper Saranac Lake,	Santa Clara,	Franklin,	400,000
"	Lower Saranac Lake,	Harrietstown,	"	300,000
"	Hoel Pond,	Santa Clara,	"	500,000
"	Big Clear,	Harrietstown,	"	750,000
"	Little Clear,	Santa Clara,	"	300,000
"	First Lake,	Webb,	Herkimer,	400,000
"	Third Lake,	"	"	600,000
"	Fourth Lake,	"	"	1,500,000
"	Big Moose Lake,	"	"	500,000
"	Mud Lake,	Lake Pleasant,	Hamilton,	200,000
"	Piseco Lake,	Arietta,	"	500,000
"	Sacandaga Lake,	Lake Pleasant,	"	500,000
"	Lake Pleasant,	"	"	500,000

DISTRIBUTION OF SHRIMPS — FRESH WATER.

NAME OF APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
W. E. Snell,	Big Brook,	Worth,	Jefferson,	5,000
M. M. Suits,	White Bottom Creek,	Eldridge,	Onondaga,	5,000
Chas. Stark,	Benton Brook,	Dover,	Dutchess,	5,000

DISTRIBUTION OF TOM COD.

NAME OF APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
F., G. & F. Com.,	Cold Spring Harbor,		Suffolk,	27,000,000
"	Northport Harbor,		"	4,000,000
"	Huntington Harbor,		"	4,000,000
"	Oyster Bay Harbor,		Queens,	2,000,000
"	Hudson River,	Tarrytown,	Westchester,	1,000,000

DISTRIBUTION OF PERCH YEARLINGS.

NAME OF APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
A. Van Tassell,	Chrysler's Pond,	Copake,	Columbia,	500
J. W. Dee,	Hornby Lake,	Hornby,	Steuben,	500
C. Y. Fullington,	Grass River,	Canton,	St. Lawrence,	1,000
Geo. H. Burrows,	Mohawk River,	Little Falls,	Herkimer,	1,000
W. Van Debogart,	Mill Pond,	Copake,	Columbia,	500
S. B. Heaton,	Monbaska Lake,	Monroe,	Orange,	1,000
W. H. Brooks,	Big Meadow and others,	Highland,	"	1,000
M. J. Volker,	Ellicott Creek,	Tonawanda,	Erie,	1,000
F., G. & F. Com.,	Esopus Creek,	Esopus,	Ulster (adult)	36
C. E. Babcock,	Lake Ontario,	Newfane,	Niagara,	2,000
H. J. Hodgkin,	No Name Pond,	Elma,	Erie,	500
C. H. Babcock,	Littleville Pond,	Manchester,	Ontario,	2,000
W. F. Keller,	Jennings Pond,	Palermo,	Oswego,	500
L. E. Filkins,	Oak Orchard Creek,	Shelby,	Orleans,	500
M. L. Nelson, Secy.,	Long and other lakes,	Highland,	Orange,	500
A. J. Johnson,	No Name,	Irondequoit,	Monroe,	200

DISTRIBUTION OF MUSCALONGE.

NAME OF APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
A. J. Gilbert,	Honeyoye Lake,	Richmond,	Ontario,	150,000
J. H. Lamphere,	Fairhaven Bay,	Sterling,	Cayuga,	100,000
W. D. Snell,	Lake Ontario,	Hounsfield,	Jefferson,	100,000
J. W. Beebe,	Cassadaga Lake,	Stockton,	Chautauqua,	25,000
E. Tyler,	Henderson Bay,	Henderson,	Jefferson,	100,000
E. S. Brown,	Tonawanda Creek,	Pendleton,	Niagara,	25,000
W. B. Hull,	Niagara River,	Buffalo,	Erie,	50,000
L. B. Ruttenber,	E. & W. Mud Lake,	Arkwright,	Chautauqua,	50,000
W. J. Volker,	Ellicott Creek,	Tonawanda,	Erie,	50,000
R. P. Grant,	St. Lawrence River,		Jefferson,	780,000
L. B. Beyer,	Niagara River,	Buffalo,	Erie,	150,000
Gouverneur A. Club,	Muscalonge Lake,	Theresa,	Jefferson,	100,000
Clarence Lazell,	Bear Lake,	Stockton,	Chautauqua,	75,000
F., G. & F. Com.,	Chautauqua Lake,		"	3,055,000
H. E. McGuire, Pres.,	Conesus Lake,	Lakeville,	Livingston,	50,000

DISTRIBUTION OF BULLHEAD FRY.

NAME OF APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
E. C. Harvey,	Salisbury Pond,	Georgetown,	Madison,	1,000
E. L. Smith, Sec.,	Erieville Lake,	Nelson,	"	1,000
Erie Preserving Co.,	Park Lake,	Brant,	Erie,	1,000
G. B. Huested,	Skinner Creek,	Ellisburg,	Jefferson,	1,000

DISTRIBUTION OF BULLHEAD YEARLINGS.

NAME OF APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
H. McArthur,	Long Pond,	Ancram,	Columbia,	500
W. Neeling,	Chrysler's Pond,	"	"	500
I. L. Taublin,	Quarry Lake,	Oneida,	Madison,	500

DISTRIBUTION OF LOBSTERS.

NAME OF APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
B. S. Meeks,	Raritan Bay,	Prince's Bay,	Richmond,	400,000
F., G. & F. Com.,	Loyd's Neck Reef,	Huntington,	Suffolk,	562,000
"	Eaton's Neck Reef,	"	"	500,000
"	Centre Island Reef,	Oyster Bay,	Queens,	500,000
"	Rocky Point Reef,	"	"	66,000

DISTRIBUTION OF PICKEREL.

NAME OF APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
F., G. & F. Com.,	Littleville Pond,	- - - - - -	Ontario,	64
F. P. Hazleton,	Lime Lake,	Machias,	Cattaraugus,	50
M. S. Nelson, Sec.,	Long and other lakes,	Highland,	Orange,	20

DISTRIBUTION OF SMELTS.

NAME OF APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
F., G. & F. Com.,	Cold Spring Harbor,	Huntington,	Suffolk,	1,500,000

DISTRIBUTION OF SHAD.

NAME OF APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
F., G. & F. Com.,	Hudson River,	Catskill,	Greene,	2,500,000
"	"	"	"	6,500,000
"	"	"	"	3,000,000
"	"	"	"	1,748,800
"	Smithtown,	Smithtown,	Suffolk,	365,000
"	Prince's Bay,	Huntington,	"	200,000

DISTRIBUTION OF HERRING.

NAME OF APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
F., G. & F. Com.,	Hudson River,	Catskill,	Greene,	1,000,000

DISTRIBUTION OF WHITEFISH.

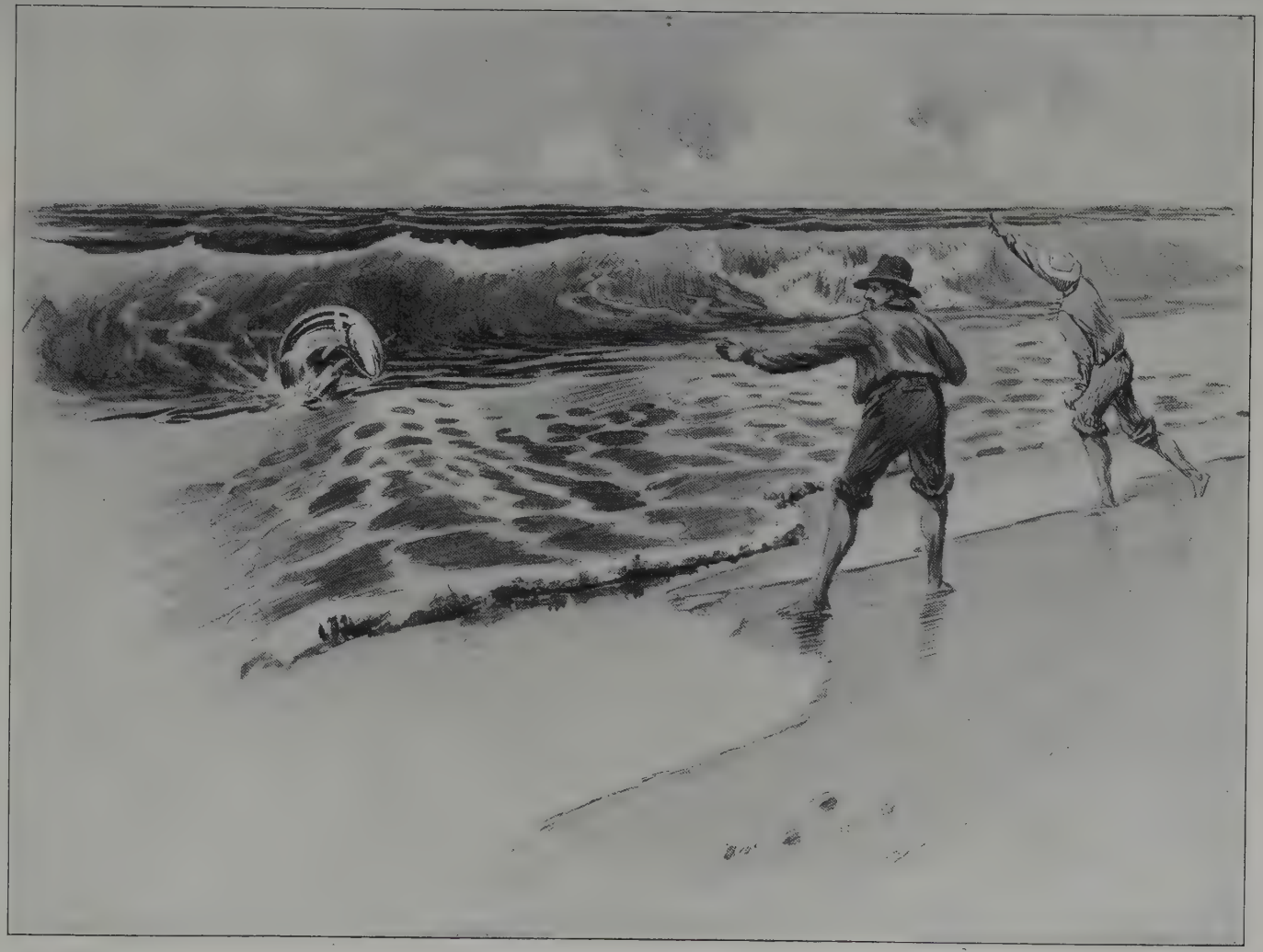
NAME OF APPLICANT	WATER STOCKED	TOWN	COUNTY	AMOUNT
C. F. Wilson,	Lake Ontario,	Wilson,	Niagara,	1,800,000
A. L. Smith,	"	Newfane,	"	1,875,000
F., G. & F. Com.,	Canadice Lake,	Livonia,	Livingston,	250,000
"	Lake Ontario,	Charlotte,	Monroe,	3,000,000
"	Canandaigua Lake,	Canandaigua,	Ontario,	5,000,000
"	Hemlock Lake,	Lavonia,	Livingston,	5,000,000
H. A. Wagoner,	Lake Ontario,	Youngstown,	Niagara,	1,200,000
H. G. Cornell,	Niagara River,	Lewiston,	"	800,000
F., G. & F. Com.,	Skaneateles Lake,	Skaneateles,	Onondaga,	500,000
"	Lake Ontario,	Wilson,	Niagara,	2,500,000
"	"	Newfane,	"	3,000,000
"	"	Charlotte,	Monroe,	1,000,000
"	"	Oswego,	Oswego,	1,750,000

TOTAL SUMMARY OF FISH PLANTED

From September 30, 1898, to September 30, 1899.

VARIETY.	AGE.	AMOUNT PLANTED.	
Brook trout,	Fry,	4,215,000	
Brook trout,	Fingerlings,	175,750	
Brook trout,	Yearlings,	65,010	
Brook trout,	Two to seven years old,	22	
Brook trout,	Five to seven years old,	275	
	Total,		4,455,057
Brown trout,	Fry,	1,373,000	
Brown trout,	Fingerlings,	200,216	
Brown trout,	Yearlings,	59,496	
Brown trout,	Two to ten years old,	21	
Brown trout,	One and one-half years old,	200	
Brown trout,	Two years old,	25	
Brown trout,	Three years old,	6	
	Total,		1,632,964
Rainbow trout,	Fry,	88,000	
Rainbow trout,	Fingerlings,	219,150	
Rainbow trout,	Yearlings,	128,766	
Rainbow trout,	Two years old,	50	
Rainbow trout,	Two to five years old,	18	
Rainbow trout,	Three years old,	6	
	Total,		435,990
Lake trout,	Fry,	522,000	
Lake trout,	Fingerlings,	422,525	
Lake trout,	Yearlings,	39,813	
	Total,		1,004,338
Red throat trout,	Fingerlings,	31,800	
Red throat trout,	Yearlings,	68,473	
Red throat trout,	Eggs,	20,000	
Red throat trout,	Four years old,	8	
	Total,		120,281
Pike perch,	Fry,	45,275,041	
Pike perch,	Yearlings,	600	
Pike perch,	Adults,	48	
	Total,		45,275,689
	Forward,		52,924,319

VARIETY.	AGE.	AMOUNT PLANTED.	
		Brought forward,	52,924,319
Bass,	Fry,	132,506	
Bass,	Yearlings, small-mouth,	500	
Bass,	Adults, big-mouth, 10 to 19 inches,	152	
Bass,	Adults,	159	
Bass,	Adults, big-mouth,	564	
	Total,		133,881
Bullheads,	Yearlings,	1,500	
Bullheads,	Fry,	4,000	
	Total,		5,500
Pickerel,	Fry,	64	
Pickerel,	Yearlings,	70	
	Total,		134
Tom cods,	Fry,		38,000,000
Smelts,	Fry,		1,500,000
Herrings,	Fry,		1,000,000
Lobster,	Fry,		2,028,000
Frost fish,	Fry,		7,600,000
Muscalonge,	Fry,		4,860,000
Shad,	Fry,		14,313,800
Shrimp, fresh-water,			1,500
Yellow perch,	Yearlings,	12,700	
Yellow perch,	Adults,	36	
	Total,		12,736
Whitefish,			27,675,000
	Grand total,		150,294,370



CASTING FOR BLUEFISH.

The Commercial Fisheries of Lake Erie, Lake Ontario, and the Niagara and St. Lawrence Rivers.

By JOHN N. COBB, Agent of the U. S. Fish Commission.

(Published by permission of the Hon. George M. Bowers, U. S. Commissioner of Fish and Fisheries.)

A METROPOLITAN FISHERMAN.

THE State of New York is favorably situated for the prosecution of the commercial fisheries. In the eastern and southeastern portion of the State there are extensive vessel and boat fisheries for sea and fresh-water fishes, mollusks and crustaceans. On the various inland lakes and streams sport fishing is extensively carried on, but there is little commercial fishing in those waters. Lakes Erie and Ontario have very valuable commercial fisheries; this is true to a less extent of the Niagara and St. Lawrence rivers. During the year 1900 the writer was detailed by the U. S. Commissioner of Fish and Fisheries to investigate and report upon the condition of the commercial fisheries of the last-named waters for the year 1899; the following report presents in a condensed form the information then collected.

St. Lawrence River.

The prosecution of commercial fisheries on the St. Lawrence river is not encouraged under the laws of the State of New York. In 1899 the only commercial fisheries carried on were those employing set lines for sturgeon and seines for catching suckers and bait fishes. A number of small seines were used in procuring bait for use in the extensive hand line fishery for sport, and these have been included in the present account of the commercial fisheries, as they gave employment to a number of persons and proved a source of considerable revenue during the summer season. The set lines average about 500 feet in length, and have from 75 to 80 branch lines bearing the hooks. The sturgeon taken are all dressed before shipment and the eggs prepared as caviar.

The principal fishing towns on the river are Ogdensburg, Chippewa Bay, Alexandria Bay and Clayton.

The accompanying tables show the men, boats, apparatus and shore property employed in the fisheries, and the catch by counties, apparatus and species.

Lake Ontario.

This lake, which is the smallest of all the Great Lakes, is 185 miles long and has an average width of 40 miles. Including indentations, the portion of shore line in the State of New York is about 265 miles. The only rivers of importance emptying into the lake are the Niagara, Genesee and Oswego. The eastern shore of the lake is broken by bays, with numerous islands, while the portion west of Sodus Point is generally more regular in outline, being only occasionally indented by very small bays.

The principal fishing towns on the lake are Cape Vincent, Three-Mile Bay, Chaumont, Sacket Harbor, Sandy Creek, Port Ontario, North Fair Haven, Sodus Point, Oak Orchard (Point Breeze, P. O.), Olcott, Wilson and Youngstown.

Fishing has been carried on in Lake Ontario since the founding of the earliest settlements along its shores. In earlier times all the fish taken were consumed locally, but as means of transportation increased, trade with the interior settlements was built up. This trade gradually assumed large proportions and furnished employment to a considerable number of persons. During recent years there has been a continuous decrease in the yield of fish from Lake Ontario. The year 1897, however, showed a slight increase, while a further increase occurred in 1899. The latter

TABLE SHOWING BY COUNTIES THE MEN, BOATS, APPARATUS AND SHORE PROPERTY EMPLOYED IN THE FISHERIES OF ST. LAWRENCE RIVER IN 1899.

DESIGNATION	ST. LAWRENCE		JEFFERSON		TOTAL	
	NUMBER	VALUE	NUMBER	VALUE	NUMBER	VALUE
Fishermen,	48	- - -	21	- - -	69	- - -
Boats,	43	$250	11	$110	54	$360
Apparatus of capture:						
Seines,	3	60	13	234	16	294
Set lines (yards),	20,000	360	500	9	20,500	369
Shore property,	- - -	300	- - -	- - -	- - -	300
Total	- - -	$970	- - -	$353	- - -	$1,323

TABLE SHOWING BY COUNTIES, APPARATUS AND SPECIES, THE YIELD OF THE FISHERIES OF ST. LAWRENCE RIVER IN 1899.

APPARATUS AND SPECIES	ST. LAWRENCE		JEFFERSON		TOTAL	
	POUNDS	VALUE	POUNDS	VALUE	POUNDS	VALUE
Seines :						
Minnows,	800	$40	17,900	$1,343	18,700	$1,383
Suckers,	14,400	72	- -	- -	14,400	72
Total,	15,200	$112	17,900	$1,343	33,100	$1,455
Set lines :						
Sturgeon,	48,000	$2,880	800	$43	48,800	$2,923
Caviar,	- -	2,520	- -	90	- -	*2,610
Total,	48,000	$5,400	800	$133	48,800	$5,533
Grand total,	63,200	$5,512	18,700	$1,476	81,900	$6,988

* Represents 4,320 pounds of caviar; this weight has been included with that of the sturgeon.

CLEANING AND DRYING GILL NETS AT YOUNGSTOWN.

PAYING OUT THE GILL NET.

was especially noteworthy, the increase over 1897 being 1,391,166 pounds. The accompanying table shows, for certain years, the catch of the principal species separately, also the total catch for the lake and the value of the same.

The increased yield of fishes in this lake in 1899, as compared with former years when the fisheries were canvassed, was almost entirely in the common species. Among the more important species herring shows a small increase over 1897, while sturgeon increased over both 1893 and 1897. The trout catch has been insignificant since 1880. The catch of whitefish in 1897, as compared with that for 1893, showed an increase, but it dropped off somewhat in 1899. Efforts are being made, through artificial propagation, by the U. S. Commission of Fish and Fisheries and the State Fish Commission, to increase the supply of the more valuable species, especially whitefish, and beneficial results are already apparent.

The principal fishing in Lake Ontario is carried on from Jefferson county, where nearly one-half of the total catch is made. Niagara county, at the western end of the lake, ranks next in this respect. In the eastern end of the lake the use of all kinds of netting is allowed in the numerous bays, and as a result the catch is made up principally of the common fishes. In Niagara county gill nets and set lines form the principal apparatus and the catch is made up of the better varieties; the greater part of the catch of whitefish and blue pike is made in this county.

There is no vessel fishery on this lake at the present time, the catch, as a whole, being made with boats of less than five tons. Two vessels were used in transporting fish from Canada.

Salmon.— Many years ago Atlantic salmon (*Salmo salar*) were common in Lake Ontario and its tributaries. They gradually diminished, however, owing to over fishing and the pollution and obstructions in the rivers where the spawning beds were located, so that of late years the appearance of one has been a rarity.

Sixty or seventy years ago they were especially abundant in Salmon River, according to the late Mr. B. E. Ingersoll, of Oswego. "He was born and lived within 100 rods of the river until 16 years of age. His grandfather was the second man to settle in the town of Richland, and his father was brought to the region at the age of two years. The abundance of salmon seems to have been a very important factor in the settlement of the region; the salmon were all the settlers had to depend on for ready money and constituted a valuable and easily accessible food. About fifty years ago his father and a Mr. Arthur Matheson, while fishing from a boat with jacklight and spear, caught 601 salmon in a single night." *

*Report on the Fisheries of Lake Ontario, by Hugh M. Smith. Bull. U. S. Fish Com. for 1890, p. 196.

COMPARATIVE TABLE SHOWING (IN POUNDS) THE YIELD OF THE FISHERIES OF LAKE ONTARIO IN 1880, 1885, 1890, 1893, 1897 AND 1899.

SPECIES	1880	1885	1890	1893	1897	1899
Herring (including longjaws)	611,219	403,585	598,978	164,998	46,222	61,878
Sturgeon,	545,283	386,974	541,752	56,863	101,635	140,185
Trout,	569,700	20,510	41,010	6,204	2,349	15,432
Whitefish,	1,064,000	90,711	148,771	45,380	181,968	161,935
Other fish,	849,800	1,496,686	2,115,937	586,140	586,722	1,933,332
Total,	3,640,000	2,398,466	3,446,448	859,585	920,896	2,312,062
Total value,	$159,700	$95,869	$124,786	$29,260	$34,295	$93,526

The possibility of restoring this early abundance by restocking the rivers was discussed for a number of years, but nothing of importance was done until within the last few years. Numerous plants of young salmon, mainly quinnant salmon from the Pacific coast, have been made in the various streams tributary to the lake, but principally in Salmon River, since 1897. According to Mr. Lewis Brown, of Port Ontario, hundreds of salmon could be seen in the river in 1899. He saw ten jump out of the water in one day. Quite a number which had been killed by lamprey eels were seen floating on the water. Many were noticed trying to jump Pulaski dam, about three miles above the mouth of the river. They were first noticed in the river in the latter part of July, and were seen from that time until the river was frozen over. This is said to have been the first time that salmon have been seen in the river for twenty years.

I was also informed that salmon had been seen in Sandy Pond, which is about four miles south of the mouth of Sandy Creek. This pond, which is merely separated from the lake by sand banks, is about four miles long and about one-half mile wide. Its connection with the lake is through a small creek.

A salmon weighing about four pounds was caught in 1899 in a gill net set for whitefish in the lake opposite Wilson.

The results from the planting of salmon in Salmon River have been most gratifying so far, and it is to be hoped that the salmon will be eventually re-established in these waters.

Alewives.— The dying of large numbers of alewives in Lake Ontario still continues, although not to such an extent as was the case about eight years ago. The fish die and are washed up on the shore, generally in July and August, and, owing to their rapid decomposition, soon prove very offensive to people living nearby. Large quantities of them are captured in the trap nets at the eastern end of the lake, but no use is made of them.

Statistical Tables.— The following tables show, in detailed form, by counties, the men employed, the boats and apparatus used, shore and accessory property, and the catch by species and by species and apparatus:

TABLE SHOWING BY COUNTIES THE PERSONS EMPLOYED IN THE FISHERIES OF LAKE ONTARIO IN 1899.

COUNTIES	ON VESSELS TRANSPORTING	IN-SHORE FISHERIES	SHOREMEN	TOTAL
Jefferson,	-	130	12	142
Oswego,	2	17	1	20
Cayuga,	-	9	-	9
Wayne,	3	39	-	42
Monroe,	-	17	-	17
Orleans,	-	26	-	26
Niagara,	-	59	-	59
Total,	5	297	13	315

TABLE SHOWING, BY COUNTIES, THE VESSELS, BOATS, APPARATUS AND CAPITAL EMPLOYED IN THE FISHERIES OF LAKE ONTARIO IN 1899.

ITEMS	JEFFERSON		OSWEGO		CAYUGA		WAYNE	
	NUMBER	VALUE	NUMBER	VALUE	NUMBER	VALUE	NUMBER	VALUE
Vessels transporting,	-	-	1	$400	-	-	1	$600
Tonnage,	-	-	8	-	-	-	14	-
Outfit,	-	-	-	50	-	-	-	40
Boats,	119	$3,202	13	585	9	$360	27	815
Apparatus of capture:								
Seines,	2	50	-	-	-	-	4	65
Gill nets,	507	8,743	54	1,500	2	5	110	950
Pound nets,	1	60	-	-	-	-	-	-
Trap nets,	125	5,000	14	540	-	-	4	200
Fyke nets,	328	4,110	9	90	15	150	50	600
Dip nets,	-	-	-	-	-	-	-	-
Hand lines,	-	19	-	-	-	12	-	6
Set lines (yards),	9,501	171	35,834	118	-	-	8,334	25
Spears,	6	3	-	-	-	-	-	-
Shore and accessory property,	-	13,990	-	1,065	-	25	-	815
Cash capital,	-	20,000	-	200	-	-	-	-
Total,	-	$55,348	-	$4,548	-	$552	-	$4,116

TABLE SHOWING, BY COUNTIES, THE VESSELS, BOATS, APPARATUS AND CAPITAL EMPLOYED IN THE FISHERIES OF LAKE ONTARIO IN 1899. — CONCLUDED.

ITEMS	MONROE		ORLEANS		NIAGARA		TOTAL	
	NUMBER	VALUE	NUMBER	VALUE	NUMBER	VALUE	NUMBER	VALUE
Vessels transporting,	-	-	-	-	-	-	2	$1,000
Tonnage,	-	-	-	-	-	-	22	-
Outfit,	-	-	-	-	-	-	-	90
Boats,	12	$455	18	$795	35	$1,910	233	8,122
Apparatus of capture:								
Seines,	-	-	1	3	1	8	*8	126
Gill nets,	88	440	52	1,042	374	5,994	†1,187	18,674
Pound nets,	-	-	-	-	-	-	1	60
Trap nets,	-	-	-	-	1	50	144	5,790
Fyke nets,	18	200	15	150	16	112	451	5,412
Dip nets,	4	20	-	-	-	-	4	20
Hand lines,	-	-	-	-	-	-	-	37
Set lines (yards),	3,334	10	27,668	153	99,668	472	184,339	949
Spears,	-	-	-	-	-	-	6	3
Shore and accessory property,	-	215	-	285	-	1,665	-	18,060
Cash capital,	-	-	-	-	-	-	-	20,200
Total,	-	$1,340	-	$2,428	-	$10,211	-	$78,543

* Total length, 407 yards.

† Total length, 151,085 yards.

TABLE SHOWING, BY COUNTIES AND SPECIES, THE YIELD OF THE FISHERIES OF LAKE ONTARIO IN 1899.

SPECIES	JEFFERSON		OSWEGO		CAYUGA		WAYNE	
	POUNDS	VALUE	POUNDS	VALUE	POUNDS	VALUE	POUNDS	VALUE
Black bass,	39,965	$2,398	- -	- -	2,500	$200	5,551	$535
Bloater or longjaw,	- -	- -	-	-	1,200	72	100	5
Blue pike,	20,773	1,009	9,436	$472	- -	- -	27,714	1,485
Bullheads,	323,324	11,276	15,200	516	7,200	288	43,868	1,701
Catfish,	6,667	198	714	36	- -	- -	- -	
Eels,	118,034	5,902	1,706	57	400	20	2,552	127
German carp,	1,000	50	- -	- -	- -	- -	- -	
Herring, fresh,	5,750	281	-	-	-	-	18,396	781
Herring, salted,	25,600	1,024	- -	- -	- -	- -	- -	
Minnows,	- -	- -	-	-	-	-	800	50
Mullet,	18,820	375	16,100	322	- -	- -	25,928	778
Pickerel,	46,339	2,789	1,410	71	2,500	200	33,955	1,862
Rock bass,	26,450	265	26,000	520	- -	- -	38,778	1,112
Sturgeon,	30,886	1,640	20,887	1,249	-	-	3,000	180
Suckers,	105,944	1,059	22,600	452	1,200	36	41,546	1,209
Sunfish,	107,129	1,070	11,900	238	2,100	63	20,032	553
Trout,	14,400	774	- -	- -	- -	- -	- -	
Wall-eyed pike,	9,385	750	150	8	700	56	-	
Whitefish,	14,280	986	- -	- -	- -	- -	460	28
Yellow perch,	149,938	2,070	25,600	707	7,200	304	69,769	2,823
Caviar,	- -	234	- -	817	- -	- -	- -	160
Frogs,	1,750	306	-	- -	-	-	-	- -
Total,	1,069,434	$34,456	151,703	$5,465	25,000	$1,239	332,479	$13,389

TABLE SHOWING, BY COUNTIES AND SPECIES, THE YIELD OF THE FISHERIES OF LAKE ONTARIO IN 1899 — CONCLUDED.

SPECIES	MONROE		ORLEANS		NIAGARA		TOTAL	
	POUNDS	VALUE	POUNDS	VALUE	POUNDS	VALUE	POUNDS	VALUE
Black bass,	-	-	-	-	-	-	48,046	$3,133
Bloater, or longjaw,	-	-	-	-	-	-	1,300	77
Blue pike,	4,127	$221	6,846	$347	118,100	$5,905	186,996	9,439
Bullheads,	16,850	635	22,200	888	82,400	3,296	511,042	18,600
Catfish,	-	-	-	-	-	-	7,381	234
Eels,	548	27	-	-	600	30	123,840	6,163
German carp,	-	-	-	-	-	-	1,000	50
Herring, fresh,	26,106	1,195	800	56	8,826	399	59,878	2,712
Herring, salted,	-	-	-	-	-	-	25,600	1,024
Minnows,	-	-	500	25	2,700	135	4,000	210
Mullet,	3,900	117	-	-	2,200	44	66,948	1,636
Pickerel,	3,561	204	2,100	105	10,500	630	100,365	5,861
Rock bass,	3,900	117	1,596	59	6,244	250	102,968	2,323
Sturgeon,	2,943	177	29,539	1,958	52,930	3,407	140,185	8,611
Suckers,	6,500	155	4,000	100	15,600	382	197,390	3,393
Sunfish,	2,888	87	-	-	4,400	88	148,449	2,099
Trout,	-	-	25	2	1,007	77	15,432	853
Wall-eyed pike,	175	11	-	-	30	2	10,440	827
Whitefish,	80	5	17,215	1,174	129,900	8,785	161,935	10,978
Yellow perch,	25,285	924	14,050	565	105,278	4,033	397,117	11,426
Caviar,	-	272	-	778	-	1,310	-	*3,571
Frogs,	-	-	-	-	-	-	1,750	306
Total,	96,863	$4,147	98,871	$6,057	540,712	$28,773	2,312,062	$93,526

*Represents 4,461 pounds of caviar; this weight has been included with that of the sturgeon.

TABLE SHOWING, BY COUNTIES, APPARATUS, AND SPECIES, THE YIELD OF THE FISHERIES OF LAKE ONTARIO IN 1899.

APPARATUS AND SPECIES	JEFFERSON		OSWEGO		CAYUGA		WAYNE	
	POUNDS	VALUE	POUNDS	VALUE	POUNDS	VALUE	POUNDS	VALUE
Gill nets:								
Black bass,	-	-	-	-	-	-	1,381	$115
Bloater or longjaw,	-	-	-	-	1,200	$72	100	5
Blue pike,	5,800	$260	6,100	$305	-	-	19,073	1,041
Bullheads,	-	-	-	-	-	-	1,800	18
Herring, fresh,	-	-	-	-	-	-	18,396	781
Herring, salted,	25,600	1,024	-	-	-	-	-	-
Pickerel,	6,400	384	800	40	800	64	27,411	1,382
Rock bass,	-	-	-	-	-	-	2,845	85
Sturgeon,	21,680	1,141	13,370	798	-	-	1,200	72
Suckers,	-	-	3,600	72	-	-	6,800	204
Trout,	14,400	774	-	-	-	-	-	-
Wall-eyed pike,	-	-	-	-	-	-	-	-
Whitefish,	8,000	484	-	-	-	-	250	15
Yellow perch,	5,600	112	9,000	270	2,600	104	21,864	913
Caviar,	-	144	-	527	-	-	-	112
Total,	87,480	$4,323	32,870	$2,012	4,600	$240	101,120	$4,743

TABLE SHOWING, BY COUNTIES, APPARATUS, AND SPECIES, THE YIELD OF THE FISHERIES OF LAKE ONTARIO IN 1899 — CONTINUED.

APPARATUS AND SPECIES	MONROE		ORLEANS		NIAGARA		TOTAL	
	POUNDS	VALUE	POUNDS	VALUE	POUNDS	VALUE	POUNDS	VALUE
Gill nets:								
Black bass,	-	-	-	-	-	-	1,381	$115
Bloater or longjaw,	-	-	-	-	-	-	1,300	77
Blue pike,	4,127	$221	6,846	$347	118,100	$5,905	160,046	8,079
Bullheads,	-	-	-	-	-	-	1,800	18
Herring, fresh,	26,106	1,195	800	56	8,826	399	54,128	2,431
Herring, salted,	-	-	-	-	-	-	25,600	1,024
Pickerel,	2,705	157	-	-	-	-	38,116	2,027
Rock bass,	-	-	1,596	59	6,244	250	10,685	394
Sturgeon,	-	-	10,060	663	15,730	1,038	62,040	3,712
Suckers,	-	-	-	-	-	-	10,400	276
Trout,	-	-	25	2	1,007	77	15,432	853
Wall-eyed pike,	-	-	-	-	30	2	30	2
Whitefish,	80	5	17,215	1,174	129,900	8,785	155,445	10,463
Yellow perch,	13,385	493	12,750	513	101,475	3,919	166,674	6,324
Caviar,	-	-	-	179	-	428	-	*1,390
Total,	46,403	$2,071	49,292	$2,993	381,312	$20,803	703,077	$37,185

*Represents 1,732 pounds of caviar; this weight has been included with that of the sturgeon.

TABLE SHOWING, BY COUNTIES, APPARATUS, AND SPECIES, THE YIELD OF THE FISHERIES OF LAKE ONTARIO IN 1899 — CONTINUED.

APPARATUS AND SPECIES	JEFFERSON		OSWEGO		CAYUGA		WAYNE	
	POUNDS	VALUE	POUNDS	VALUE	POUNDS	VALUE	POUNDS	VALUE
Pound and trap nets:								
Black bass,	11,765	$824	-	-	-	-	-	-
Blue pike,	14,973	749	3,336	$167	-	-	1,200	$72
Bullheads,	99,910	3,517	1,600	40	-	-	1,400	56
Catfish,	3,712	111	-	-	-	-	-	-
Eels,	79,321	3,966	1,100	33	-	-	225	11
German carp,	1,000	50	-	-	-	-	-	-
Herring,	5,750	281	-	-	-	-	-	-
Mullets,	18,820	375	13,000	260	-	-	1,800	54
Pickerel,	24,546	1,491	210	11	-	-	-	-
Rock bass,	21,950	220	26,000	520	-	-	5,100	102
Sturgeon,	1,440	104	-	-	-	-	-	-
Suckers,	31,200	312	14,900	298	-	-	3,700	74
Sunfish,	36,551	365	8,100	162	-	-	4,812	96
Wall-eyed pike,	9,385	750	150	8	-	-	-	-
Whitefish,	6,280	502	-	-	-	-	210	13
Yellow perch,	58,829	923	10,500	315	-	-	4,200	126
Total,	425,432	$14,540	78,896	$1,814	-	-	22,647	$604

TABLE SHOWING, BY COUNTIES, APPARATUS, AND SPECIES, THE YIELD OF THE FISHERIES OF LAKE ONTARIO IN 1899 — CONTINUED.

APPARATUS AND SPECIES	MONROE		ORLEANS		NIAGARA		TOTAL	
	POUNDS	VALUE	POUNDS	VALUE	POUNDS	VALUE	POUNDS	VALUE
Pound and trap nets :								
Black bass,	-	-	-	-	-	-	11,765	$824
Blue pike,	-	-	-	-	-	-	19,509	988
Bullheads,	-	-	-	-	12,400	$496	115,310	4,109
Catfish,	-	-	-	-	-	-	3,712	111
Eels,	-	-	-	-	600	30	81,246	4,040
German carp,	-	-	-	-	-	-	1,000	50
Herring,	-	-	-	-	-	-	5,750	281
Mullets,	-	-	-	-	2,200	44	35,820	733
Pickerel,	-	-	-	-	-	-	24,756	1,502
Rock bass,	-	-	-	-	-	-	53,050	842
Sturgeon,	-	-	-	-	-	-	1,440	104
Suckers,	-	-	-	-	1,600	32	51,400	716
Sunfish,	-	-	-	-	4,400	88	53,863	711
Wall-eyed pike,	-	-	-	-	-	-	9,535	758
Whitefish,	-	-	-	-	-	-	6,490	515
Yellow perch,	-	-	-	-	3,800	114	77,329	1,478
Total,	-	-	-	-	25,000	$804	551,975	$17,762

TABLE SHOWING, BY COUNTIES, APPARATUS AND SPECIES, THE YIELD OF THE FISHERIES OF LAKE ONTARIO IN 1899 — CONTINUED.

APPARATUS AND SPECIES	JEFFERSON		OSWEGO		CAYUGA		WAYNE	
	POUNDS	VALUE	POUNDS	VALUE	POUNDS	VALUE	POUNDS	VALUE
Fyke nets :								
Blue pike,	- -	- -	- -	- -	- -	- -	7,441	$372
Bullheads,	215,414	$7,479	13,600	$476	7,200	$288	34,684	1,387
Catfish,	2,955	87	714	36	- -	- -	- -	- -
Eels,	38,113	1,906	606	24	400	20	1,706	85
Mullet,	- -	- -	3,100	62	- -	- -	14,518	436
Pickerel,	14,093	836	400	20	500	40	1,444	72
Rock bass,	3,500	35	- -	- -	- -	- -	25,300	759
Suckers,	57,944	579	4,100	82	1,210	36	21,146	634
Sunfish,	69,858	698	3,800	76	2,100	63	9,820	295
Wall-eyed pike,	- -	- -	- -	- -	- -	- -	- -	- -
Yellow perch,	83,709	1,017	6,100	122	3,000	120	16,100	588
Total,	485,586	$12,637	32,420	$898	14,400	$567	132,159	$4,628

TABLE SHOWING, BY COUNTIES, APPARATUS AND SPECIES, THE YIELD OF THE FISHERIES OF LAKE ONTARIO IN 1899 — CONTINUED.

APPARATUS AND SPECIES	MONROE		ORLEANS		NIAGARA		TOTAL	
	POUNDS	VALUE	POUNDS	VALUE	POUNDS	VALUE	POUNDS	VALUE
Fyke nets:								
Blue pike,	- -	- -	- -	- -	- -	- -	7,441	$372
Bullheads,	16,850	$635	22,220	$888	70,000	$2,800	379,948	13,953
Catfish,	- -	- -	- -	- -	- -	- -	3,669	123
Eels,	548	27	-	-	-	-	41,373	2,062
Mullet,	3,900	117	- -	- -	- -	- -	21,518	615
Pickerel,	856	47	2,100	105	10,500	630	29,893	1,750
Rock bass,	3,900	117	- -	- -	- -	- -	32,700	911
Suckers,	6,500	155	4,000	100	14,000	350	108,890	1,936
Sunfish,	2,888	87	- -	- -	- -	- -	88,466	1,219
Wall-eyed pike,	175	11	-	-	-	-	175	11
Yellow perch,	9,700	321	1,300	52	- -	- -	119,909	2,220
Total,	45,317	$1,517	29,600	$1,145	94,500	$3,780	833,982	$25,172

TABLE SHOWING, BY COUNTIES, APPARATUS, AND SPECIES, THE YIELD OF THE FISHERIES OF LAKE ONTARIO IN 1899 — CONTINUED.

APPARATUS AND SPECIES	JEFFERSON		OSWEGO		CAYUGA		WAYNE	
	POUNDS	VALUE	POUNDS	VALUE	POUNDS	VALUE	POUNDS	VALUE
Seines:								
Bullheads,	8,000	$280	-	-	-	-	5,984	$240
Eels,	600	30	-	-	-	-	621	31
Minnows,	-	-	-	-	-	-	800	50
Mullets,	-	-	-	-	-	-	9,610	288
Pickerel,	1,300	78	-	-	-	-	-	-
Rock bass,	1,000	10	-	-	-	-	5,533	166
Suckers,	16,800	168	-	-	-	-	9,900	297
Sunfish,	720	7	-	-	-	-	5,400	162
Yellow perch,	1,800	18	-	-	-	-	12,405	506
Total,	30,200	$591	-	-	-	-	50,253	$1,740
Hand lines:								
Black bass,	28,200	$1,574	-	-	2,500	$200	4,209	$420
Pickerel,	-	-	-	-	1,200	96	5,100	408
Wall-eyed pike,	-	-	-	-	700	56	-	-
Yellow perch,	-	-	-	-	1,600	80	15,200	690
Total,	28,200	$1,574	-	-	6,000	$432	24,500	$1,518

TABLE SHOWING, BY COUNTIES, APPARATUS, AND SPECIES, THE YIELD OF THE FISHERIES OF LAKE ONTARIO IN 1899—CONTINUED.

APPARATUS AND SPECIES	MONROE		ORLEANS		NIAGARA		TOTAL	
	POUNDS	VALUE	POUNDS	VALUE	POUNDS	VALUE	POUNDS	VALUE
Seines:								
Bullheads,	-	-	-	-	-	-	13,984	$520
Eels,	-	-	-	-	-	-	1,221	61
Minnows,	-	-	500	$25	2,700	$135	4,000	210
Mullets,	-	-	-	-	-	-	9,610	288
Pickerel,	-	-	-	-	-	-	1,300	78
Rock bass,	-	-	-	-	-	-	6,533	176
Suckers,	-	-	-	-	-	-	26,700	465
Sunfish,	-	-	-	-	-	-	6,120	169
Yellow perch,	-	-	-	-	-	-	14,205	524
Total,	-	-	500	$25	2,700	$135	83,673	$2,491
Hand lines:								
Black bass,	-	-	-	-	-	-	34,900	$2,194
Pickerel,	-	-	-	-	-	-	6,300	504
Wall-eyed pike,	-	-	-	-	-	-	700	56
Yellow perch,	-	-	-	-	-	-	16,800	770
Total,							58,700	$3,524

TABLE SHOWING, BY COUNTIES, APPARATUS, AND SPECIES, THE YIELD OF THE FISHERIES OF LAKE ONTARIO IN 1899 — CONTINUED.

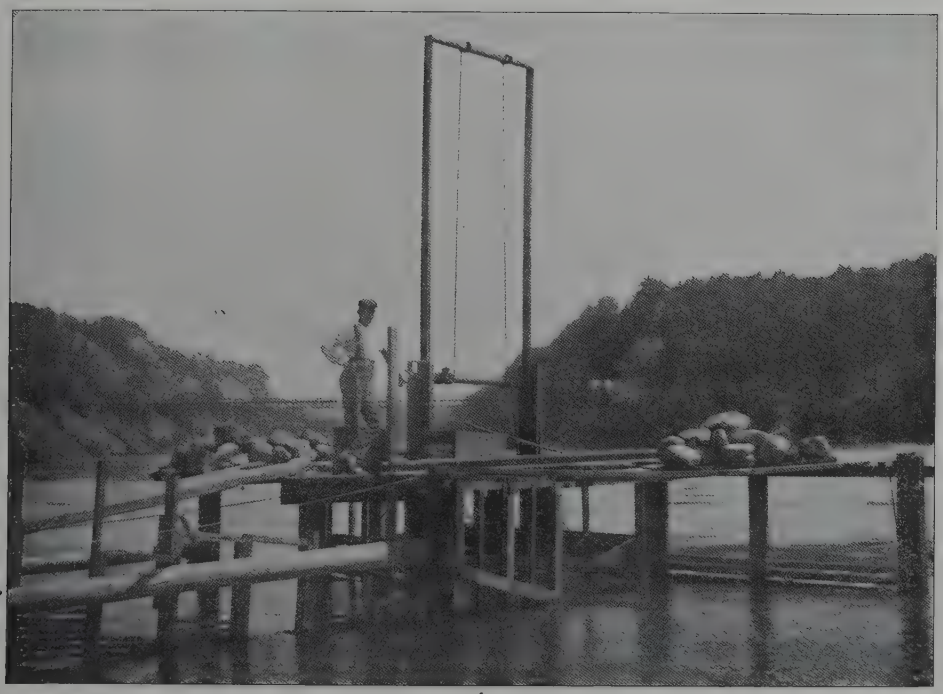
APPARATUS AND SPECIES	JEFFERSON		OSWEGO		CAYUGA		WAYNE	
	POUNDS	VALUE	POUNDS	VALUE	POUNDS	VALUE	POUNDS	VALUE
Set lines:								
Sturgeon,	7,766	$395	7,517	$451	- -	- -	1,800	$108
Caviar,	- -	90	- -	290	-	-	- -	48
Total,	7,766	$485	7,517	$741	- -	- -	1,800	$156
Miscellaneous (Dip nets and spears):								
Yellow perch,	- -	- -	- -	- -	- -	- -	- -	- -
Frogs,	1,750	$306	-	-	-	-	-	-
Total,	1,750	$306	- -	- -	- -	- -	- -	- -
Grand total,	1,066,434	$34,456	151,703	$5,465	25,000	$1,239	332,479	$13,389

TABLE SHOWING, BY COUNTIES, APPARATUS, AND SPECIES, THE YIELD OF THE FISHERIES OF LAKE ONTARIO IN 1899 — CONCLUDED.

APPARATUS AND SPECIES	MONROE		ORLEANS		NIAGARA		TOTAL	
	POUNDS	VALUE	POUNDS	VALUE	POUNDS	VALUE	POUNDS	VALUE
Set lines :								
Sturgeon,	2,943	$117	19,479	$1,295	37,200	$2,369	76,705	$4,795
Caviar,	- -	272	- -	599	- -	882	- -	*2,181
Total,	2,943	$449	19,479	$1,894	37,200	$3,251	76,705	$6,976
Miscellaneous (Dip nets and spears) :								
Yellow perch,	2,200	$110	- -	- -	- -	- -	2,220	$110
Frogs,	- -	- -	-	-	-	-	1,750	306
Total,	2,200	$110	- -	- -	- -	- -	3,950	$416
Grand total,	96,863	$4,147	98,871	$6,057	540,712	$28,773	2,312,062	$93,526

* Represents 2,729 pounds of caviar; this weight has been included with that of the sturgeon.

HAULING IN THE GILL NET.



A FISHING MACHINE ON NIAGARA RIVER.

The Wholesale Trade.— The wholesale fishery trade of Lake Ontario is confined to Cape Vincent and North Fair Haven, there being one firm in each place. These firms had $10,300 invested in property, $20,200 cash capital, and paid out $6,000 in wages. They handled 1,230,920 pounds of fish, with a value of $93,999. Nearly all of these fish were imported from Canada. The items, "persons," "property" and "cash capital" in connection with the wholesale trade have been included in the fishery tables accompanying this report.

Imports of Canadian Fish.— An important feature is the importation of fish from Canada through the various custom houses located on Lake Ontario. This business does not, of course, appear in the regular fishery tables, and is given here solely for the purpose of showing to what extent Canadian-caught fish figures in our markets. The following table shows the importations during the calendar year 1899. Although Niagara Falls is not on Lake Ontario it is shown here for convenience sake.

IMPORTS THROUGH CUSTOM HOUSES ON LAKE ONTARIO OF CANADIAN FISH IN 1899.

PLACES	FREE		DUTIABLE		
	POUNDS	ENTERED VALUE	POUNDS	ENTERED VALUE	DUTY
Cape Vincent,	17,298	$589	963,527	$38,601	$4,161 15
North Fair Haven,	-	-	20,375	367	50 93
Sodus Point,	-	-	2,597	-	6 49
Pultneyville,	-	-	2,545	52	8 57
Rochester,	-	-	27,289	914	68 23
Niagara Falls,	-	-	1,617,308	51,160	4,043 00
Total,	17,298	$589	2,633,641	$91,094	$8,338 37

Niagara River.

In this river the State of New York has wisely confined fishing largely to hand lining for game fish, as the use of nets, etc., in such a narrow stream would prove very destructive. Some years ago "fishing machines," or traps, were used in the river below the falls, but in the course of time they were forbidden by both Canada and New York. About three years ago Canadian fishermen were permitted to resume this manner of fishing, and as a result of the protests entered by the New

York fishermen the authorities on this side have allowed them to engage in the same fishery in the town of Lewiston so long as it is permitted on the Canadian side of the river.

The "fishing machine" is probably unique among the forms of fishing apparatus employed in the United States. A framework of timbers, similar to a small wharf, is built out from the shore about 20 or 30 feet, and is heavily weighted with large stones to prevent its being carried away by the swift current. In the center of this structure is a well inclosed on all sides except the one facing down the river. A square wooden box, with sides about 8 inches in height, and a bottom of fine-meshed iron screen, is lowered into the well, into which it fits easily, by means of a windlass. As the well is open on the side facing down the river, fish, which swim close to the shore on their way up the river so as to escape the swift current farther out, enter it. When the fish are running well the box is raised about every half hour to a level with the platform, the water escaping through the screen as it comes above the surface. The fish of legal size and kind are then removed from the box while the others are allowed to escape when it is lowered again, which is done almost immediately. These machines are used from about the middle of May until the ice forms in the fall. The principal species taken in them are sturgeon, white bass and yellow perch. All game fish and small fish must be returned to the river again.

Indians are permitted to use spears in fishing on the river and a few of them engage in the business when sturgeon are running. They usually fish from rocks favorably situated along the shore.

The following tables show the men, apparatus, shore property, and catch by species and apparatus on the river in 1899:

TABLE SHOWING, BY COUNTIES, THE MEN, BOATS, APPARATUS AND SHORE PROPERTY EMPLOYED IN THE FISHERIES OF NIAGARA RIVER IN 1899.

ITEMS	NIAGARA	
	NUMBER	VALUE
Fishermen,	7	
Apparatus of capture:		
Fishing machines,	4	$400
Spears,	3	4
Shore property,		80
Total,		$484

TABLE SHOWING, BY COUNTIES, APPARATUS AND SPECIES, THE YIELD OF THE FISHERIES OF NIAGARA RIVER IN 1899.

APPARATUS AND SPECIES	NIAGARA	
	NUMBER	VALUE
Fishing machines :		
Sturgeon,	300	$18
White bass,	2,300	92
Yellow perch,	9,900	396
Total,	12,500	$506
Spears :		
Sturgeon,	670	$40
Caviar,	- - -	*70
Total,	670	$110
Grand total,	13,170	$616

Lake Erie.

This lake is the fourth in size of the Great Lakes, the only smaller one being Lake Ontario. It is about 240 miles long, with an average width of 40 miles, the greatest width, 58 miles, being opposite Ashtabula Harbor, Ohio. Its area is 9,000 square miles. It is by far the shallowest of all the lakes, the average depth being 80 feet, while the greatest depth is only 220 feet. The shallowest portion is at the western end, while the deepest portion is at the eastern end between Erie, Pennsylvania, and Dunkirk, New York, and around Long Point Island, Canada. The American shore of the lake is about 414 miles in length, and is formed by the States of New York, Pennsylvania, Ohio and Michigan. Ohio has the longest shore line, 247 miles, followed by New York with 75 miles, Pennsylvania with 47 miles, and Michigan with 45 miles of shore.

Two counties of New York abut upon the lake, Erie and Chautauqua. The principal fishing towns in these are Buffalo, North Evans, Irving, Dunkirk, Van Buren and Barcelona.

*Represents 140 pounds of caviar; this weight has been included with that of the sturgeon.

The fisheries of this lake are of immense importance and far surpass those of any other of the Great Lakes or of any other body of fresh water in the world. When one considers the enormous increase of the fishery apparatus used in this lake during many years, it is surprising that the catch has been so well sustained. One cause of the important position occupied by the lake is the unusually favorable conditions for the operation of certain forms of apparatus. Owing to the shoal water pound and trap nets can be set at almost any distance from the shore, which is not possible in the other lakes, owing to their great depths. In the western end of the lake, in the vicinity of the Bass Islands, are vast spawning grounds, where millions of eggs are taken annually and hatched by the U. S. Fish Commission.

As the purpose of this article is to show the extent of the New York fisheries on Lake Erie, the fisheries of the other States will only be mentioned when necessary.

Vessel Fisheries.— For a number of years steam tugs were not employed in the New York fisheries of the lake, although much used in Pennsylvania and Ohio. In 1899, however, there were 7 tugs used in Erie county and 3 in Chautauqua, hailing respectively from Buffalo, Dunkirk and Barcelona. These vessels are small tug boats, averaging about 17 tons each. The crew vary from 4 to 7 men, including captain, engineer and cook. In this section of the lake the captain generally receives $21, the engineer $20, and the others $16.32 per week in wages. The crew furnish their own food. The tugs are provided with iron-lined holds fore and aft, in which to carry the fish. The vessels carry gill nets exclusively, the different sizes being known as herring, sturgeon, trout and whitefish nets. Other varieties of fish besides those enumerated are also captured in them. On board the vessel the nets are kept in plain unpainted boxes with flaring sides and ends, the boxes having hand-holes at the ends for facility in handling when full. A box will usually hold five or six nets, except in the case of the herring nets, which, owing to their smaller size, occupy considerably less space. A vessel in this section of the lake carries from 250 to 300 of the various nets. As fishing for the different species is carried on at different times, only the nets specially adapted are carried. Of the nets employed in each fishery only about two-thirds are in the water at one time, a portion of the remainder being on shore to be dried, cleaned and repaired, while the balance are stowed in the hold of the vessel to be brought forth in case of an emergency. The fishing is almost continuous, the only intermission being when the boats are tied up on account of ice. When thaws occur during the winter the boats frequently break their way out and fish until a change in the weather occurs. This does not often happen in New York, however, as the ice seems to set more firmly in

Dunkirk and Buffalo than in the other harbors, and as a result the boats find difficulty in getting out even when all the other harbors are open.

The nets are fished directly from the deck of the vessel. They are run out in strings, or gangs, at right angles to the shore, the length of the strings varying with the number of nets being fished. The nets are usually lifted every other day, but frequently storms prevent the vessel from getting out and they are allowed to remain in the lake three or four days. In the latter case the fish are usually all spoiled and must be thrown away.

Owing to the ice remaining in the harbors very late in 1899 the vessels could not get out, and thus lost a considerable part of the whitefish season.

Shore Fisheries.— In the shore fisheries trap nets, gill nets, seines, set lines and hand lines are used. The gill nets are practically the same as those used in the vessel fishery. Very few trap nets are used owing to the existence of a law forbidding the setting of nets within one-half mile of shore. Set lines constitute a very common form of apparatus and are set principally for sturgeon and catfish, although a few other varieties are taken incidentally. Sturgeon lines are usually about 4,000 feet in length, and have at intervals of about eight feet branch lines three or four feet in length, with hooks at the ends. The lines are usually put out in the evening and lifted in the morning, when the fish and the branch lines are removed and freshly baited branch lines attached. The catfish lines vary from these only in being of shorter length and having smaller hooks.

Ice Fishing.— This fishery, which is one of the most interesting in the country, is carried on from the city of Buffalo each winter. It is a favorite occupation with the sailors, dockmen and laborers who are thrown out of work during the winter months by the suspension of lake traffic. In 1899 about 600 persons engaged in the business somewhat regularly. If all who participated in the fishery were counted there would be over 2,000, but most of these only fished for a few days or a week and then gave it up.

As soon as the ice freezes sufficiently, which is usually about December 1st, the fishing commences and continues until the spring break-up, about March 1st. Some years thaws occur, which very materially shorten the fishing season; the season usually lasts about ninety days. Blue pike form by far the greater part of the catch, the other species taken being saugers, wall-eyed pike, yellow perch and a very few ling.

The fishing grounds are located from one to ten miles from shore, and the men usually start for the grounds about 5 in the morning. A number of the fishermen have sleds, which are drawn by dogs, to carry the apparatus and bait required in the

fishery and bring in the catch. Some of the men push their sleds themselves. Nearly 200 dogs and sleds were used last winter in this fishery. The dogs are of all sizes and breeds, some of them being of considerable value. In some instances dogs are undoubtedly stolen from persons who have no idea of the ultimate use to which their pets are put. After the fishing ceases most of the dogs can be purchased from the fishermen for a mere trifle.

A fisherman's outfit consists of an axe, shovel, ice-chisel, the "tip-up," or catching apparatus, a bait can, and a small piece of sail cloth with two short poles for forming a wind-break on windy days. The ice-chisel is made by fastening a sharp piece of steel, about 2 inches in width, into the end of a pole 5 feet in length, and is used in keeping the fishing holes clear of ice.

"The 'tip-up' is constructed of two sticks, 18 and 24 inches long, respectively, 1 inch wide, and a half inch thick, firmly tied together with twine in the form of a cross, the free end of the line being attached to a hollow lead sinker by means of a loop of copper wire driven through the sinker, the ends of the wire being brought out below and bent at right angles for the attachment of the lines with the hooks appended. Each 'tip-up' has two hooks, which are suspended about 18 inches below the sinker. The hooks are baited with minnows and are lowered through the hole in the ice to within 3 or 4 inches of the bottom. The ends of the short cross stick rest on the ice on either side of the hole, the short end of the long stick being over the center of the hole. The line is caught in a number of turns around this stick so that the weight of the sinker may be just sufficient to make the frame lie flat upon the ice. When the fish is nibbling at the bait it causes the end of the cross to *tip up*, whence the name; and when the fish suddenly seizes the bait the long arm becomes almost perpendicular to the surface of the ice and shows that the fish has been caught. The fish is then drawn to the surface, taken from the hook the latter freshly baited and lowered to its former position."* Each fisherman has from 3 to 5 holes under his care. They are usually about 18 inches in width, with varying lengths. The fishermen insist upon a rigid enforcement of the width rule as otherwise there would be considerable danger of someone falling into the holes. The minnows used for bait consist chiefly of "chubs," "silversides," etc., and are caught in dip nets in the outer harbor and along the Niagara river.

There are serious dangers in this business. Thaws are apt to occur suddenly and fishermen be carried away by the floating ice or possibly drowned by the collapsing of the ice. Sudden storms are also apt to occur. On February 26, 1887, two fishermen were frozen to death on the ice during a severe storm.

* Report of U. S. Fish Com. for 1887, p. 290.

DOG AND SLED USED IN THE ICE FISHING NEAR BUFFALO, N. Y.

The season of 1899 was a very poor one, the fishing only lasting about 5 weeks.

Statistical Tables.— The following tables show in full for Erie and Chautauqua counties, New York, and in a condensed form for Pennsylvania, Ohio and Michigan, the number of persons employed, the vessels, boats, apparatus, shore and accessory property and cash capital utilized, the catch by species alone and the catch by species and apparatus:

TABLE SHOWING THE PERSONS EMPLOYED IN THE FISHERIES OF LAKE ERIE IN 1899.

	ON VESSELS FISHING	ON VESSELS TRANSPORTING	IN BOAT FISHERIES	SHORESMEN	TOTAL
Erie,	38	-	743	75	856
Chautauqua,	17	-	74	29	120
Total for New York,	55	-	817	104	976
Total for Pennsylvania,	156	2	206	100	464
Total for Ohio,	363	55	1,268	482	2,168
Total for Michigan,	-	8	110	2	120
Grand total,	574	65	2,401	688	3,728

TABLE SHOWING THE VESSELS, BOATS, APPARATUS, SHORE PROPERTY AND CASH CAPITAL EMPLOYED IN THE FISHERIES OF LAKE ERIE IN 1899.

ITEMS	ERIE		CHAUTAUQUA		TOTAL FOR NEW YORK		TOTAL FOR PENNSYLVANIA	
	NUMBER	VALUE	NUMBER	VALUE	NUMBER	VALUE	NUMBER	VALUE
Vessels fishing (steamers),	7	$24,500	3	$9,500	10	$34,000	25	$60,200
Tonnage,	136	-	31	-	167	-	284	-
Outfit,	-	4,760	-	2,310	-	7,070	-	20,485
Vessels transporting (steamers),	-	-	-	-	-	-	1	1,000
Tonnage,	-	-	-	-	-	-	16	-
Outfit,	-	-	-	-	-	-	-	150
Boats,	98	3,900	35	5,205	133	9,105	47	5,855
Steamboats and launches under five tons,	-	-	1	850	1	850	2	2,200
Apparatus used in vessel fisheries:								
Gill nets,	1,775	9,898	1,220	7,235	*2,995	17,133	9,024	51,962
Apparatus used in shore fisheries:								
Seines,	1	150	3	250	†4	400	-	-
Gill nets,	1,060	7,402	2,224	14,633	‡3,284	22,035	2,340	14,130
Pound nets,	-	-	-	-	-	-	50	19,900
Trap nets,	17	770	7	265	24	1,035	102	3,710
Fyke nets,	-	-	-	-	-	-	-	-
Hoop nets,	-	-	-	-	-	-	-	-
Hand lines,	-	300	-	-	-	300	-	90
Set lines, yards	162,668	1,952	29,334	368	192,002	2,320	-	-
Spears,	-	-	-	-	-	-	-	-
Minor apparatus,	-	-	-	-	-	-	-	-
Pile drivers,	-	-	-	-	-	-	10	1,155
Shore and accessory property,	-	122,625	-	5,520	-	128,145	-	170,265
Cash capital,	-	86,500	-	12,500	-	99,000	-	105,000
Total,	-	$262,757	-	$58,636	-	$321,393	-	$456,102

*Length, 236,445 yards. †Length, 275 yards. ‡Length, 292,471 yards.

TABLE SHOWING THE VESSELS, BOATS, APPARATUS, SHORE PROPERTY AND CASH CAPITAL EMPLOYED IN THE FISHERIES OF LAKE ERIE IN 1899 — CONCLUDED.

ITEMS	TOTAL FOR OHIO		TOTAL FOR MICHIGAN		GRAND TOTAL	
	NUMBER	VALUE	NUMBER	VALUE	NUMBER	VALUE
Vessels fishing (steamers),	50	$187,200	-	-	85	$281,400
Tonnage,	796	-	-	-	1,247	-
Outfit,	-	43,326	-	-	-	70,881
Vessels transporting (steamers),	16	63,500	2	$10,200	19	74,700
Tonnage,	351	-	51	-	418	-
Outfit,	-	9,630	-	3,216	-	12,996
Boats,	615	43,747	63	3,659	858	62,366
Steamboats and launches under five tons,	15	14,050	-	-	18	17,100
Apparatus used in vessel fisheries:						
Gill nets,	16,999	91,775	-	-	29,018	160,870
Apparatus used in shore fisheries:						
Seines,	92	7,425	8	565	104	8,390
Gill nets,	7,036	32,147	-	-	12,660	68,312
Pound nets,	988	259,475	260	33,750	1,298	313,125
Trap nets,	257	10,400	43	1,230	426	16,375
Fyke nets,	555	15,130	62	620	617	15,750
Hoop nets,	232	116	-	-	232	116
Hand lines,	-	23	-	-	-	413
Set lines, yards	192,672	737	-	-	384,674	3,057
Spears,	8	10	-	-	8	10
Minor apparatus,	-	16	-	-	-	16
Pile drivers,	48	22,705	11	2,190	69	26,050
Shore and accessory property,	-	711,410	-	15,107	-	1,024,927
Cash capital,	-	359,700	-	-	-	563,700
Total,	-	$1,872,522	-	$70,537	-	$2,720,554

TABLE SHOWING, BY COUNTIES AND STATES, THE SPECIES TAKEN IN THE FISHERIES OF LAKE ERIE IN 1899.

SPECIES	ERIE COUNTY		CHAUTAUQUA COUNTY		TOTAL FOR NEW YORK		TOTAL FOR PENNSYLVANIA	
	POUNDS	VALUE	POUNDS	VALUE	POUNDS	VALUE	POUNDS	VALUE
Black bass,	9,053	$705	1,526	$117	10,579	$822	38,299	$3,031
Blue pike,	499,109	21,579	309,772	8,932	808,881	30,511	1,522,939	44,520
Bullheads,	- -	- -	- -	- -	- -	- -	- -	- -
Catfish,	107,866	3,236	28,377	851	136,243	4,087	100,727	3,022
Crappie,	- -	- -	- -	- -	- -	- -	60,000	1,800
Dogfish or bowfin,	-	-	-	-	-	-	- -	- -
Eels,	- -	- -	- -	- -	- -	- -	-	-
German carp,	2,790	56	6,715	134	9,505	190	12,195	244
Herring,	1,609,526	22,041	1,712,032	21,513	3,321,558	43,554	10,742,315	134,142
Ling,	200	14	- -	- -	200	14	- -	- -
Muscalonge,	- -	- -	-	-	- -	- -	190	13
Moon-eye,	-	-	- -	- -	-	-	- -	- -
Mullet,	22,372	358	16,312	163	38,684	521	119,128	1,327
Pickerel or grass pike,	- -	- -	- -	- -	- -	- -	8,497	680
Rock bass,	-	-	-	-	-	-	- -	- -
Saugers,	9,000	630	115	3	9,115	633	11,110	327
Sheepshead,	7,130	72	3,000	30	10,140	102	57,993	580
Sturgeon,	508,925	23,072	118,508	3,662	627,433	26,734	99,570	3,098
Suckers,	41,114	411	13,572	136	54,686	547	1,117	12
Sunfish,	- -	- -	- -	- -	- -	- -	125,000	3,750
Trout,	943	75	28,299	1,435	29,242	1,510	722	61
Wall-eyed pike,	11,099	668	11,149	557	22,248	1,225	67,394	3,048
White bass,	32,719	654	12,713	254	45,432	908	454,434	8,639
Whitefish,	53,522	3,214	118,934	7,693	172,456	10,907	615,821	46,690
Yellow perch,	163,056	2,963	94,876	1,428	257,932	4,391	815,553	16,911
Caviar,	-	12,850	- -	1,413	- -	14,263	- -	3,992
Isinglass,	-	- -	-	- -	-	- -	-	- -
Frogs,	- -	- -	- -	-	- -	-	-	-
Turtles,	-	- -	-	- -	-	- -	-	- -
Total,	3,078,424	$92,598	2,475,900	$48,321	5,554,324	$140,919	14,053,004	$275,887

TABLE SHOWING, BY COUNTIES AND STATES, THE SPECIES TAKEN IN THE FISHERIES OF LAKE ERIE IN 1899—CONCLUDED.

SPECIES	TOTAL FOR OHIO		TOTAL FOR MICHIGAN		GRAND TOTAL	
	POUNDS	VALUE	POUNDS	VALUE	POUNDS	VALUE
Black bass,	83,714	$5,933	1,154	$80	133,746	$9,866
Blue pike,	2,212,966	64,270	- -	- -	4,544,786	139,301
Bullheads,	115,171	3,453	38,991	1,157	154,162	4,610
Catfish,	588,858	18,050	22,714	682	848,542	25,841
Crappie,	- -	- -	- -	- -	60,000	1,800
Dogfish or bowfin,	-	-	540	5	540	5
Eels,	99	8	550	39	649	47
German carp,	3,417,094	47,176	194,903	3,846	3,633,697	51,456
Herring,	19,345,986	252,792	17,938	539	33,427,797	431,037
Ling,	- -	-	- -	- -	200	14
Muscalonge,	-	- -	9	1	199	14
Moon-eye,	43,836	867	-	- -	43,836	867
Mullet,	478,229	4,870	- -	-	636,041	6,718
Pickerel or grass pike,	730	37	10,199	510	19,426	1,227
Rock bass,	5,296	91	- -	- -	5,296	91
Saugers,	2,962,096	73,363	44,244	990	3,026,565	75,313
Sheepshead,	1,043,818	6,792	35,181	177	1,147,122	7,651
Sturgeon,	50,094	1,845	12,305	578	789,402	32,255
Suckers,	693,553	8,050	183,337	2,750	932,693	11,359
Sunfish,	36,800	407	13,640	205	175,440	4,362
Trout,	2,060	165	- -	- -	32,024	1,736
Wall-eyed pike,	1,195,705	57,323	449,867	24,859	1,735,214	86,455
White bass,	1,055,951	20,046	40,707	1,010	1,596,524	30,603
Whitefish,	1,049,578	76,276	228,459	18,136	2,066,314	152,009
Yellow perch,	2,174,564	30,310	67,447	1,013	3,315,496	52,625
Caviar,	- -	2,659	- -	208	- -	*21,122
Isinglass,	-	15	-	- -	-	†15
Frogs,	982	172	- -	-	982	172
Turtles,	67,211	2,324	-	- -	67,211	2,324
Total,	36,624,391	$677,314	1,362,185	$56,785	58,393,904	$1,150,895

*Represents 32,365 pounds; this weight has been shown under sturgeon. †Represents 29 pounds; this weight has been shown under sturgeon.

TABLE SHOWING THE CATCH BY APPARATUS IN THE VESSEL FISHERIES OF LAKE ERIE IN 1899.

APPARATUS AND SPECIES	ERIE		CHAUTAUQUA		TOTAL FOR NEW YORK	
	POUNDS	VALUE	POUNDS	VALUE	POUNDS	VALUE
Gill nets:						
Blue pike,	224,948	$6,870	156,027	$4,681	380,975	$11,551
Herring,	1,425,891	19,133	755,393	9,442	2,181,284	28,575
Mullet,	5,626	113	2,797	28	8,423	141
Saugers,	-	-	-	-	-	-
Sturgeon,	12,411	450	8,472	257	20,883	707
Trout,	843	67	27,286	1,365	28,129	1,432
Wall-eyed pike,	4,501	225	5,661	283	10,162	508
White bass,	662	13	-	-	662	13
Whitefish,	42,371	2,542	40,893	2,791	83,264	5,333
Yellow perch,	105,487	1,582	51,982	780	157,469	2,362
Caviar,	-	209	-	64	-	*273
Total,	1,823,110	$31,204	1,048,611	$19,691	2,871,251	$50,895

* Represents 470 pounds; this weight has been shown in the sturgeon column.

TABLE SHOWING THE CATCH BY APPARATUS IN THE VESSEL FISHERIES OF LAKE ERIE OF 1899 — CONCLUDED.

APPARATUS AND SPECIES	TOTAL FOR PENNSYLVANIA		TOTAL FOR OHIO		GRAND TOTAL	
	POUNDS	VALUE	POUNDS	VALUE	POUNDS	VALUE
Gill nets :						
Blue pike,	837,951	$24,921	660,058	$19,980	1,878,984	$56,452
Herring,	9,651,865	120,648	15,337,385	197,794	27,170,534	347,017
Mullet,	6,001	83	6,161	63	20,585	287
Saugers,	5,555	169	322,240	9,130	327,795	9,299
Sturgeon,	3,716	186	-	-	24,599	893
Trout,	705	60	2,060	165	30,894	1,657
Wall-eyed pike,	28,740	1,138	12,139	647	51,041	2,293
White bass,	-	-	3,753	76	4,415	89
Whitefish,	415,206	33,223	259,710	20,260	758,180	58,816
Yellow perch,	543,996	8,332	1,168,167	17,480	1,899,632	28,174
Caviar,	-	-	-	-	-	273
Total,	11,493,735	$188,760	17,801,673	$265,595	32,166,659	$505,250

TABLE SHOWING THE CATCH, BY APPARATUS, IN THE SHORE FISHERIES OF LAKE ERIE IN 1899.

APPARATUS AND SPECIES	ERIE		CHAUTAUQUA		TOTAL FOR NEW YORK	
	POUNDS	VALUE	POUNDS	VALUE	POUNDS	VALUE
Gill nets:						
Black bass,	-	-	-	-	-	-
Blue pike,	106,400	$3,192	142,935	$4,027	249,335	$7,219
Catfish,	-	-	-	-	-	-
German carp,	-	-	-	-	-	-
Herring,	182,500	2,885	956,425	12,067	1,138,925	14,952
Mullet,	2,004	30	1,415	14	3,419	44
Pickerel,	-	-	-	-	-	-
Saugers,	-	-	115	3	115	3
Sturgeon,	309,598	16,372	67,087	2,147	376,685	18,519
Suckers,	-	-	-	-	-	-
Trout,	100	8	1,013	70	1,113	78
Wall-eyed pike,	366	19	5,297	265	5,663	284
White bass,	-	-	-	-	-	-
Whitefish,	11,100	668	78,041	4,902	89,141	5,570
Yellow perch,	47,513	915	37,086	559	84,599	1,474
Caviar,	-	9,524	-	834	-	10,358
Total,	659,581	$33,613	1,289,414	$24,888	1,948,995	$58,501

TABLE SHOWING THE CATCH, BY APPARATUS, IN THE SHORE FISHERIES OF LAKE ERIE IN 1899 — CONTINUED.

APPARATUS AND SPECIES	TOTAL FOR PENNSYLVANIA, OHIO AND MICHIGAN		GRAND TOTAL	
	POUNDS	VALUE	POUNDS	VALUE
Gill nets:				
Black bass,	59	$5	59	$5
Blue pike,	336,265	10,310	585,600	17,529
Catfish,	687	21	687	21
German carp,	50,819	965	50,819	965
Herring,	3,347,980	42,851	4,486,905	57,803
Mullet,	3,711	38	7,130	82
Pickerel,	11	1	11	1
Saugers,	105,879	2,145	105,994	2,148
Sturgeon,	29,078	911	405,763	19,430
Suckers,	7,987	80	7,987	80
Trout,	17	1	1,130	79
Wall-eyed pike,	15,238	632	20,901	916
White bass,	77	2	77	2
Whitefish,	352,983	24,789	442,124	30,359
Yellow perch,	295,768	4,335	380,367	5,809
Caviar,	-	893	-	11,251
Total,	4,546,559	$87,979	6,495,554	$146,480

TABLE SHOWING THE CATCH, BY APPARATUS, IN THE SHORE FISHERIES OF LAKE ERIE IN 1899 — CONTINUED.

APPARATUS AND SPECIES	ERIE		CHAUTAUQUA		TOTAL FOR NEW YORK	
	POUNDS	VALUE	POUNDS	VALUE	POUNDS	VALUE
Trap net:						
Black bass,	8,853	$689	1,526	$117	10,379	$806
Blue pike,	5,361	165	10,810	224	16,171	389
Bullheads,	-	-	-	-	-	-
Catfish,	29,166	875	5,853	175	35,019	1,050
German carp,	2,220	44	-	-	2,200	44
Herring,	1,135	23	214	4	1,349	27
Mullet,	14,742	215	-	-	14,742	215
Muscalonge,	-	-	-	-	-	-
Pickerel,	-	-	-	-	-	-
Rock bass,	-	-	-	-	-	-
Saugers,	-	-	-	-	-	-
Sheepshead,	6,660	67	3,000	30	9,660	97
Sturgeon,	1,560	77	10,633	323	12,193	400
Suckers,	32,714	327	13,572	136	46,286	463
Sunfish,	-	-	-	-	-	-
Wall-eyed pike,	632	32	191	9	823	41
White bass,	25,357	507	3,813	76	29,170	583
Whitefish,	51	4	-	-	51	4
White perch,	-	-	-	-	-	-
Yellow perch,	4,656	88	5,808	89	10,464	177
Caviar,	-	1	-	112	-	113
Total,	133,087	$3,114	55,420	$1,295	188,507	$4,409

TABLE SHOWING THE CATCH, BY APPARATUS, IN THE SHORE FISHERIES OF LAKE ERIE IN 1899 — CONTINUED.

APPARATUS AND SPECIES	TOTAL FOR PENNSYLVANIA, OHIO AND MICHIGAN		GRAND TOTAL	
	POUNDS	VALUE	POUNDS	VALUE
Trap net:				
Black bass,	47,404	$3,430	57,783	$4,236
Blue pike,	25,332	745	41,503	1,134
Bullheads,	12,955	387	12,955	387
Catfish,	152,564	4,612	187,583	5,662
German carp,	50,300	930	52,500	974
Herring,	5,721	75	7,070	102
Mullet,	185,790	1,953	200,532	2,168
Muscalonge,	9	1	9	1
Pickerel,	3,936	197	3,936	197
Rock bass,	1,106	17	1,106	17
Saugers,	190,741	3,817	190,741	3,817
Sheepshead,	14,635	110	24,295	229
Sturgeon,	10,440	269	22,633	669
Suckers,	169,809	1,706	216,095	2,169
Sunfish,	9,112	133	9,112	133
Wall-eyed pike,	94,477	3,651	95,300	3,692
White bass,	761,480	14,985	790,650	15,568
Whitefish,	1,756	139	1,807	143
White perch,	1,096	22	1,096	22
Yellow perch,	79,935	1,089	90,399	1,266
Caviar,	- -	204	- -	317
Total,	1,818,598	$38,472	2,007,105	$42,881

TABLE SHOWING THE CATCH, BY APPARATUS, IN THE SHORE FISHERIES OF LAKE ERIE IN 1899 — CONTINUED.

APPARATUS AND SPECIES	ERIE		CHAUTAUQUA		TOTAL FOR NEW YORK	
	POUNDS	VALUE	POUNDS	VALUE	POUNDS	VALUE
Seine :						
Black bass,	-	-	-	-	-	-
Bullheads,	-	-	-	-	-	-
Catfish,	5,500	$165	8,600	$258	14,100	$423
German carp,	590	12	6,715	134	7,305	146
Mooneye,	-	-	-	-	-	-
Mullet,	-	-	12,100	121	12,100	121
Rock bass,	-	-	-	-	-	-
Saugers,	-	-	-	-	-	-
Sheepshead,	470	5	-	-	470	5
Suckers,	8,400	84	-	-	8,400	84
Sunfish,	-	-	-	-	-	-
Wall-eyed pike,	-	-	-	-	-	-
White bass,	6,700	134	8,900	178	15,600	312
Yellow perch,	-	-	-	-	-	-
Total,	21,660	$400	36,315	$691	57,975	$1,091

TABLE SHOWING THE CATCH, BY APPARATUS, IN THE SHORE FISHERIES OF LAKE ERIE IN 1899 — CONTINUED.

APPARATUS AND SPECIES	TOTAL FOR PENNSYLVANIA, OHIO AND MICHIGAN		GRAND TOTAL	
	POUNDS	VALUE.	POUNDS	VALUE
Seine :				
Black bass,	17,889	$1,253	17,889	$1,253
Bullheads,	26,910	806	26,910	806
Catfish,	7,504	224	21,604	647
German carp,	3,034,003	40,686	3,041,308	40,832
Mooneye,	1,165	23	1,165	23
Mullet,	250	3	12,350	124
Rock bass,	100	2	100	2
Saugers,	149,235	4,430	149,235	4,430
Sheepshead,	-	-	470	5
Suckers,	61,720	912	70,120	996
Sunfish,	32,500	355	32,500	355
Wall-eyed pike,	18,222	799	18,222	799
White bass,	200	4	15,800	316
Yellow perch,	10,145	102	10,145	102
Total,	3,359,843	$49,599	3,417,818	$50,690

TABLE SHOWING THE CATCH, BY APPARATUS, IN THE SHORE FISHERIES OF LAKE ERIE IN 1899 — CONTINUED.

APPARATUS AND SPECIES	ERIE		CHAUTAUQUA		TOTAL FOR NEW YORK	
	POUNDS	VALUE	POUNDS	VALUE	POUNDS	VALUE
Hand line:						
Black bass,	-	-	-	-	-	-
Blue pike,	162,000	$11,340	-	-	162,000	$11,340
Crappie,	-	-	-	-	-	-
Ling,	200	14	-	-	200	14
Herring,	-	-	-	-	-	-
Pickerel,	-	-	-	-	-	-
Saugers,	9,000	630	-	-	9,000	630
Sunfish,	-	-	-	-	-	-
Wall-eyed pike,	5,600	392	-	-	5,600	392
Yellow perch,	5,400	378	-	-	5,400	378
Total,	182,200	$12,754	-	-	182,200	$12,754

TABLE SHOWING THE CATCH, BY APPARATUS, IN THE SHORE FISHERIES OF LAKE ERIE IN 1899 — CONTINUED.

APPARATUS AND SPECIES	TOTAL FOR PENNSYLVANIA, OHIO AND MICHIGAN		GRAND TOTAL	
	POUNDS	VALUE	POUNDS	VALUE
Hand line:				
Black bass,	22,000	$1,760	22,000	$1,760
Blue pike,	39,000	1,950	201,000	13,290
Crappie,	60,000	1,800	60,000	1,800
Ling,	-	-	200	14
Herring,	6,000	180	6,000	180
Pickerel,	8,497	680	8,497	680
Saugers,	140,000	7,000	149,000	7,630
Sunfish,	125,000	3,750	125,000	3,750
Wall-eyed pike,	8,500	667	14,100	1,059
Yellow perch,	210,000	7,850	215,400	8,228
Total,	618,997	$25,637	801,197	$38,391

TABLE SHOWING THE CATCH, BY APPARATUS, IN THE SHORE FISHERIES OF LAKE ERIE IN 1899 — CONTINUED.

APPARATUS AND SPECIES	ERIE		CHAUTAUQUA		TOTAL FOR NEW YORK	
	POUNDS	VALUE	POUNDS	VALUE	POUNDS	VALUE
Set line :						
Black bass,	200	$16	- -	- -	200	$16
Blue pike,	400	12	-	-	400	12
Catfish,	73,200	2,196	13,924	$418	87,124	2,614
German carp,	-	-	-	-	-	-
Mullet,	- -	- -	- -	- -	- -	- -
Saugers,	-	-	-	-	-	-
Sturgeon,	185,356	6,173	32,316	935	217,672	7,108
Wall-eyed pike,	-	-	-	-	-	-
White bass,	- -	- -	- -	- -	- -	- -
Yellow perch,	-	-	-	-	-	-
Caviar,	- -	3,116	- -	403	- -	3,519
Total,	259,156	$11,513	46,240	$1,756	305,396	$13,269
Pound net,	-	-	-	-	-	- -
Fyke net,	- -	- -	- -	- -	- -	-
Minor apparatus,	-	-	-	-	-	- -
Grand total,	1,255,684	$61,394	1,427,389	$28,630	2,683,073	$90,024

TABLE SHOWING THE CATCH, BY APPARATUS, IN THE SHORE FISHERIES OF LAKE ERIE IN 1899—CONCLUDED.

APPARATUS AND SPECIES	TOTAL FOR PENNSYLVANIA, OHIO AND MICHIGAN		GRAND TOTAL	
	POUNDS	VALUE	POUNDS	VALUE
Set line :				
Black bass,	370	$30	570	$46
Blue pike,	131	4	531	16
Catfish,	300,357	9,011	387,481	11,625
German carp,	22	1	22	1
Mullet,	2,188	22	2,188	22
Saugers,	18	1	18	1
Sturgeon,	-	-	217,672	7,108
Wall-eyed pike,	13	1	13	1
White bass,	174	3	174	3
Yellow perch,	78	2	78	2
Caviar,	-	-	-	3,519
Total,	303,351	$9,075	608,747	$22,344
Pound net,	11,470,675	$314,763	11,470,675	$314,763
Fyke net,	1,356,744	27,582	1,356,744	27,582
Minor apparatus,	69,405	2,514	69,405	2,514
Grand total,	23,544,172	$555,621	26,227,245	$645,645

Previous Abundance.— The two tables given below, showing for certain years the total catch of all varieties, and of herring and whitefish separately, for the whole lake, and also for Erie and Chautauqua counties, will doubtless prove interesting.

The most important point in the table for the whole lake is that the catch of all varieties, and of herring also, for 1899 exceeds that of every other year shown except 1890, while the whitefish catch for 1899 is the greatest since 1890. This is very gratifying, as it shows there is no present danger of a serious decline.

The enormous increase in the catch of whitefish in Erie county in 1899 over every other year is especially noteworthy. It is only within the last few years that the fishermen of this county have gone into this fishery to any extent. The catch of all varieties in this county in 1899 has only been exceeded in one year, 1885. In Chautauqua county the catch in 1899 was only surpassed in 1890.

BAITING SET LINES.

COMPARATIVE TABLE SHOWING THE YIELD AND VALUE OF THE FISHERIES OF LAKE ERIE IN 1880, 1885, 1890, 1893, 1897 AND 1899.

SPECIES	1880		1885		1890	
	POUNDS	VALUE	POUNDS	VALUE	POUNDS	VALUE
All varieties,	29,087,300	$474,880	51,456,517	$1,109,096	64,850,873	$1,000,905
Herring,	11,774,400		19,354,900		38,868,283	
Whitefish,	3,333,800		3,531,855		2,341,451	

COMPARATIVE TABLE SHOWING THE YIELD AND VALUE OF THE FISHERIES OF LAKE ERIE IN 1880, 1885, 1890, 1893, 1897 AND 1899—CONCLUDED.

SPECIES	1893		1897 (FISCAL YEAR)		1899	
	POUNDS	VALUE	POUNDS	VALUE	POUNDS	VALUE
All varieties,	42,968,325	$805,979	*		58,393,904	$1,150,895
Herring,	20,931,076		19,638,289		33,427,797	
Whitefish,	1,292,410		689,906		2,066,314	

* Information on all species not obtained.

COMPARATIVE TABLE SHOWING THE VALUE AND YIELD OF THE FISHERIES OF ERIE AND CHAUTAUQUA COUNTIES, NEW YORK, IN 1885, 1890, 1893, 1897 AND 1899.

	1885		1890		1893	
	POUNDS	VALUE	POUNDS	VALUE	POUNDS	VALUE
Erie county:						
All varieties,	5,723,800	$302,742	1,843,957	$65,449	2,178,138	$100,962
Herring,	12,000	- -	53,215	- -	184,600	- -
Whitefish,	13,175	-	23,150	-	- -	-
Chautauqua county:						
All varieties,	353,577	$14,088	2,797,564	$66,271	1,485,628	$37,862
Herring,	71,200	- -	1,753,905	- -	748,971	- -
Whitefish,	16,780	-	294,700	-	100,758	-
Grand total (all varieties),	6,177,377	$316,830	4,641,521	$131,720	3,663,766	$138,824

COMPARATIVE TABLE SHOWING THE VALUE AND YIELD OF THE FISHERIES OF ERIE AND CHAUTAUQUA COUNTIES, NEW YORK, IN 1885, 1890, 1893, 1897 AND 1899 — CONCLUDED.

	1897 (FISCAL YEAR)		1899	
	POUNDS	VALUE	POUNDS	VALUE
Erie county :				
All varieties,	(*)		3,078,424	$92,598
Herring,	130,000		53,522	
Whitefish,	18,000		1,609,526	
Chautauqua county :				
All varieties,	(*)		2,475,900	$48,321
Herring,	768,010		1,712,032	
Whitefish,	39,825		118,934	
Grand total (all varieties),	(*)		5,554,324	$140,919

*Information on all species not obtained.

Wholesale Trade, Etc.— A considerable wholesale trade in fishery products is carried on at Buffalo, Dunkirk and Barcelona. In Buffalo 3 firms, employing 68 persons, with property valued at $117,150, and cash capital to the amount of $75,000, handled 7,568,095 pounds of fresh and salted fish, with a value of $192,772. These firms paid in wages $46,872.

At Dunkirk and Barcelona 4 firms, employing 27 persons, were engaged in the business. They had property valued at $3,650, a cash capital of $12,500, and paid in wages $3,900. The total quantity of fish sold amounted to 1,843,179 pounds, valued at $43,946.

Three firms in Buffalo engaged in the smoking of eels, herring, sturgeon and trout. These firms employed 7 persons, had property and accessories valued at $2,370, cash capital of $11,500, and paid in wages $1,870. They used 471,350 pounds of fresh fish valued at $24,408. The smoked product amounted to 336,925 pounds, which sold for $37,697.

All of the above statistics, with the exception of wages and products, have already been shown in the tables accompanying this report.

Imports of Canadian Fish.— On the New York portion of the lake fish were only imported through the custom house at Buffalo. The following table shows the quantity imported, the estimated value, and the duty paid during the calendar year 1899:

VARIETIES	POUNDS	ENTERED VALUE	DUTY
Salt fish,	43,877	$1,729	$429 08
Fresh fish,	6,669,004	223,841	16,673 03
Skinned and boned fish,	152,080	5,505	1,901 14
Canned fish, etc.,	195	16	6 40
Total,	6,865,156	$231,091	$19,009 65

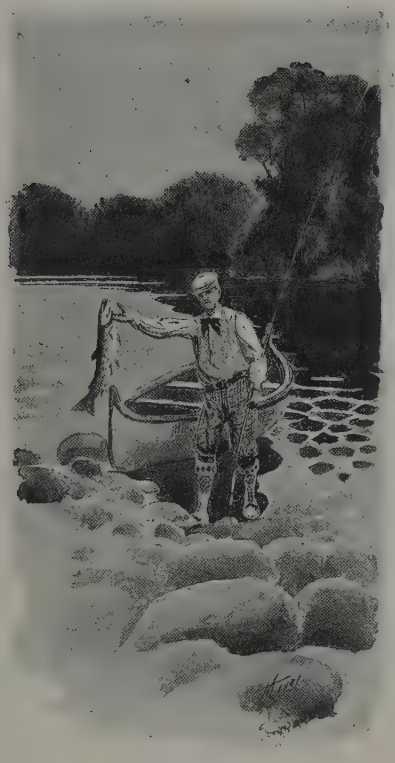
THE LARGE-MOUTH BLACK BASS

(MICROPTERUS SALMOIDES)

THE SMALL-MOUTH BLACK BASS

(MICROPTERUS DOLOMIEU)

Shad Culture in the Hudson River.



GOT HIS BREAKFAST.

THE shad fishermen of the Hudson river seem never to be quite suited with the conditions which exist in the river during the shad season, and the laws which govern the fishing are also not to their liking. Last season the shad were so abundant that the fishermen were reported to have taken up their nets before the end of the season, as shad were too cheap, and this season there are complaints that shad are scarce before the season is over, though they were numerous during the early run of the fish. A specific complaint has been brought to my notice in the Catskill *Examiner* that is so full of errors and misinformation that it demands a reply from some one, and I quote from the article in part:

"The veteran fisherman, Jacob Conine, explained to an *Examiner* reporter what he thought was the cause of the scarcity of shad in this part of the country. As he has fished in these waters many years, and has made it a study by observation and reading, it is safe to say that he speaks authoritatively. This is what he said: 'Why is it that there are so few shad caught in this section of the country? Well, for one reason, I will say this: Soon after the shad hatcheries were started along the Hudson river we noticed that our catches became less and less each year. We also noticed thousands of shad fry floating dead upon the surface of the water. Now, those in charge of the fish hatcheries say that a fish does not look after its young, but leaves them to shift for themselves, and as soon as they have spawned they go away. Now, I know as a fact, from my own observation, that

this is not true. Why, I have seen a bullhead dig a hole in the mud several inches deep and lay its eggs. They do not leave the spot for any length of time, but remain there until the fish are hatched. They stay with the little fish until they are large enough to look out for themselves. This is true of all kinds of fish. The small ones need looking after.

"'Now, what do the men employed in the hatcheries do? They are paid $25 a night to fish for roe shad. These shad go on the flats or near the banks to spawn, and are caught. Those not needed in the hatcheries are put in barrels and sent away to be eaten. As soon as the young fish are hatched in the hatcheries they are dumped overboard, and most of them die from neglect. If this thing is kept up in a few years there will be no shad. Why, I have seen more fish taken from the river in one day than there is now in a season. In some streams fishermen may fish seven days in the week, but here we are permitted to fish but five days, and pay a license of $1 per net. In the State of Vermont the fish hatcheries are maintained for less than $7,000 a year. In New York State $100,000 will not pay the expenses, and a number have made themselves wealthy in the business.'"

It may be true, as the *Examiner* reporter states, that Mr. Conine has read and observed, but it is quite evident from his interview that he has not observed the habits of shad, nor has he read anything about them that is reliable, and the entire interview is the rankest balderdash that was ever put out seriously by a newspaper upon the subject of fish culture, and as for its containing facts, it deserves to rank with that other newspaper essay which declared that the United States Fish Commission was crossing the shad with the jellyfish to eliminate the bones; a cross which would be as fruitful as a cross between a window shutter and a bull pup. There is one fact in this wonderful interview, but it is not the one that Mr. Conine declares to be such from his observation, for in that he is utterly wrong. The bullhead does guard its spawn and brood its young after they are hatched, until they separate, and there are two other fishes that do the same thing, but the shad is not one of them, the other two being the black bass and sunfish. Because Mr. Smith plays golf on Sunday it does not follow that Mr. Robinson, who lives in the same block, is a devotee of the game and swipes the ball on the same day of the week. The shad does exactly as the hatchery men told him, spawns and leaves the spawn and resulting fry, if any, to fate, and this is no new thing with shad, for they have done it ever since men knew anything about shad. Can Mr. Conine produce any evidence that any one has ever seen, not thousands, but a single dead shad fry floating on the surface of the river? Shad fry are almost transparent, and in a glass of water held up to the light they are scarcely distinguishable by the unobservant, and one man

drank a lot of them in the water he dipped from a can in the glass used for the purpose of examining the fry. It is not unusual for people to go into the shad hatchery at Catskill and with hundreds of thousands of shad fry in tanks level with their eyes, and glass on all sides, with a good light for background, ask where the young shad are. It is for this reason that I wonder if any one could see dead fry in the river even if they were there.

This is exactly what is done by the State in hatching shad for the Hudson river in the shad station at Catskill. One man from another State hatchery is sent there to take charge of this work, and two old shad fishermen are employed on the spot. This constitutes the State force. A professional shad fisherman, who has a seine hauling ground near the hatchery receives $20 per day from the State. This man employs a crew of twelve men in seine hauling for shad and herring. When the seine is hauled two of the men from the hatchery are present and examine the fish, and if any ripe females are found they are spawned artificially. The only condition imposed by the State is that a given number of hauls must be made, if necessary, on each day that he is paid.

If the eggs of the spawning shad were not taken by the hatchery men they would be lost, as shad netters never return to the river any shad taken in their nets. The $20 partly recompense the captain of the crew for the delay in overhauling his fish and for the extra hauls which may be demanded. The State does not barrel the shad or do anything else with them, for they belong to the netters and probably go where they would in any event, whether there was a hatchery or not, to market.

The eggs rescued from fish destined for market are taken to the hatchery and hatched. If there had been no market fishermen to net the shad, and they had spawned naturally, perhaps one or two per cent of the eggs would have hatched, but in the hatchery jars eighty to ninety per cent are hatched, and when the yolk sac is nearly absorbed, and the fish are ready to begin the battle for life that all fish have to begin at some time or another, they are planted in the river in just such places as the parent shad would have selected for natural hatching had they been consulted.

Should any one get the idea from the above interview that the State gets any large numbers of spawning shad by the arrangement I have mentioned, I will give the exact figures. So far this year the men at the Catskill hatchery have secured 188 spawning fish. The largest number on one day was 25, the first day; the next day 24, and the next day 5. The lowest number in one day was 2, and except the first and second days the number highest was 15. From the 188 shad the men have taken 4,940,000 eggs which would have been lost by the fish going to market if they had not been rescued and hatched at the expense of the State.

The Real Reason.

If Mr. Conine does not know why shad became scarce in the river — for they are not now, his interview to the contrary notwithstanding — I will tell him. The shad fishermen of the Hudson netted the river for market, taking everything possible out and putting nothing back until a State Fish Commission was created to remedy the injury to the fishing caused by their short sightedness. When the Commissioners, ex-Gov. Seymour, Hon. Robert B. Roosevelt and Seth Green, made an examination of the river they reported to the Legislature that the entire shad crop of the Hudson was worth $7,000. Then the shad hatcheries began their deadly work, of which Mr. Conine complained, and when, in 1895, a census was made of the shad taken that year in the Hudson, it was found to be worth at the net $184,897.60, and shad had fallen in price from 75 cents to 20 cents for roe shad and 10 cents for bucks. Over 4,000,000 pounds of shad were taken from the Hudson in that year as the result of maintaining shad hatcheries.

Some Actual Facts.

Recently I had occasion to obtain from the United States Fish Commission some figures to be used in a paper to be read before a society of natural sciences, and some of those figures fit in here, and I quote from a letter I received from Mr. W. de C. Ravenel: "The only fishery concerning which we have accurate data upon which can be based our estimate of results attributable to fish-culture is the shad fishery. In 1880 the catch of shad was 5,164,152, and its value was $995,790. The following figures show the catch of shad each year, its increase over the catch of 1880, and the annual value of the increase:

	No. of shad caught.	Increase over 1880.	Value of increase.
1887,	8,252,326	3,108,174	$395,642
1888,	10,210,453	5,046,301	676,402
1889,	12,324,106	7,159,954	782,496
1890,	12,827,525	7,663,373	823,965
1896,	13,124,013	8,019,861	660,050
1898,	13,927,730	8,823,578	466,087

"The most noticeable feature of this comparison is that the price of shad has decreased to the consumer as the catch has increased (from 19 to 10 cents each) and the returns to the fishermen even at the reduced price are much greater than in 1880."

The Hudson river has not been a self-sustaining shad stream since it was depleted by the shad netters previous to the era of artificial propagation, and there has been a constant war against the shad men to compel them by law to take up their nets during a portion of each week to permit some breeding shad to ascend the river and spawn, and they have resisted every effort in this direction which was solely to preserve the shad for the future as well as for the present day. If the Hudson had been dependent alone upon the increase from the shad of the river there would be fewer shad in the river now, but the United States Fish Commission has made generous contributions of shad fry from the Delaware and Susquehanna rivers annually for planting in the Hudson, and thus the stock has not only been kept up, but increased. From 1882 to 1901, both inclusive, the shad in the river have furnished eggs which have produced in the hatchery maintained by the State of New York 52,057,100 fry to be returned to the river. During the same period the United States Fish Commission has contributed to the Hudson from other streams 108,444,000 shad fry, or more than twice as many as the river itself was able to provide, the total of 160,501,000 shad fry being the result of artificial shad culture in the hatcheries, and all of the eggs which produced this great number of fry would have been lost had they not been rescued by the State and National Fish Commissions.

Mr. Conine says in conclusion, and as a final argument, that in the State of Vermont the fish hatcheries are maintained for less than $7,000 a year, and that in New York State $100,000 will not pay the expenses. In this he is as wide of the facts as he is in giving the habits of the shad. Vermont has one hatchery devoted to the propagation of trout and salmon. I am not sure, but I think no other fish are hatched in it, and the output from the hatchery does not concern this note. New York has eight permanent hatcheries, and if each had what is alleged to be the sum expended on the Vermont hatchery New York should expend $56,000 on the eight hatcheries. In addition to the eight hatcheries, there is the shad hatchery maintained during the shad season and a muscalonge hatchery maintained only during the muscalonge season; two whitefish egg-collecting stations maintained only through the season for taking whitefish eggs. For the fiscal year ending September 30, 1900, the total disbursement by the State of New York for maintenance of hatcheries and hatching stations, collection of eggs and the distribution of fish and fish fry, amounted to $52,772.66.

It will be noticed that the disbursements include hatcheries and hatching stations — that is, the eight permanent hatcheries which are in operation all the year, the shad station on the Hudson, the muscalonge station on Chautauqua lake, the white-

fish stations on Hemlock and Canandaigua lakes, the collection of lake trout eggs in Lakes Michigan and Superior, the collection of wild brook and lake trout eggs in the waters of the State, the collection of lobster, smelt and tomcod eggs in the sound and bays and streams of Long Island, the equipment and repairs of the State fish car, the expenses incurred in bringing the contributions of the United States into New York and in planting them by means of cars or messengers of the United States Fish Commission. For this outlay the State waters receive every year in the neighborhood of 200,000,000 fish, and it is generally conceded to be a good business investment for the State.

The declaration made by Mr. Conine in the last sentence of his interview I do not pretend to understand, and I doubt if he does. He says: "In New York State $100,000 will not pay the expenses, and a number have made themselves wealthy in the business." Which business? I really do not know how he wishes to be understood. If he means the men who hatch fish at the per diem of $1.50 to $2, he must be in error, or the men would not continue to work in all temperatures of water and in all weathers at this rate, for it is not a job that the wealthy would cling to for any length of time, and I am forced to conclude that he must have thought that he was being interviewed upon some other subject than shad culture; but if he will persist in engaging in matters relating to shad, I would suggest that he take a partner by the name of Wm. Duncan that I find mentioned in the Philadelphia *Record* under the head line:

Seriously Bitten by a Shad.

"WILMINGTON, Del., June 3.— William Duncan, aged twenty-six years, a Delaware river fisherman, was bitten by a shad and is now in the Delaware Hospital here, suffering severely. While hauling in his net ten days ago one of the fish, which was particularly vicious, seized his hand in his mouth and inflicted a painful injury. The fish had fine teeth, which cut the flesh. The wound was regarded as trivial, but in a few days the hand began to swell. Now it is inflamed and swollen much larger than the usual size, and serious results are feared. The injury is infected with a poisonous matter, and the outcome may be blood poisoning."

As the shad has no teeth, not even vicious shad, the firm might be Conine & Duncan; then if they could find the man who crossed the shad with the jellyfish, they could add "& Company," by taking him into the firm, and the only plant required would be a credulous reporter on the staff of the daily or weekly press, with a department devoted to fisheries.

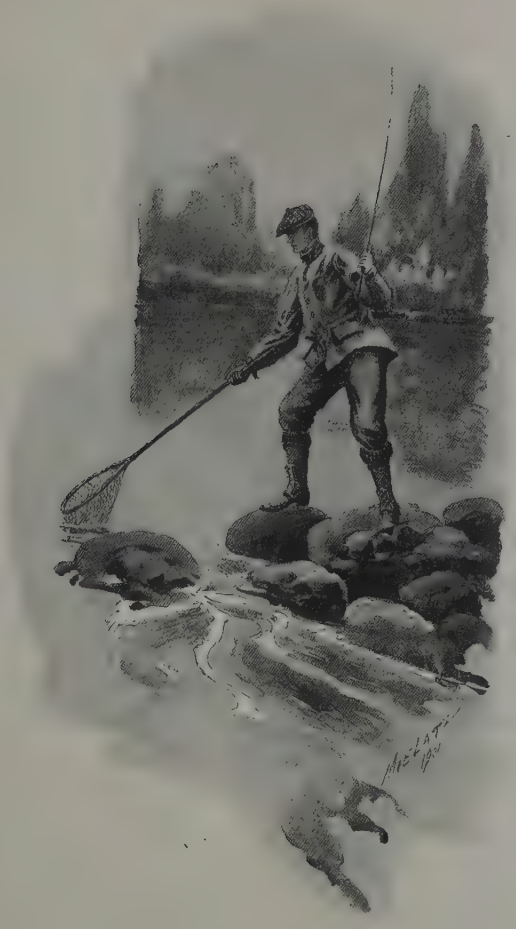
The Other Side of the Shield.

Since reading the interview I have quoted above, I have heard of Captain John Pindar, of Catskill, and as he has made his living for many years — I think all his life — as a shad fisherman, and is still in the business, it is fair to assume that he knows something about it. Captain Pindar says: "My attention having been called to certain statements alleged to have been made by Jacob Conine in an interview, I desire to say that Mr. Conine's premises are false and his conclusions are mistaken. So far this has been the best shad season in ten years, and last year on the lower Hudson was the best shad year in twenty years." Captain Pindar contends that the fish that are growing scare in the Hudson are those which are not cultivated artificially, like the sturgeon and bullheads. He underlines this statement: "*If it had not been for the shad hatcheries there would not be a shad in the Hudson to-day.*" I once heard a shad fisherman declare before a legislative committee that the run of shad in the Hudson depended solely upon whether or not the fish came into the river from the sea, and the hatching operations had nothing to do with it. Captain Pindar is not that kind of a fisherman, for he knows what he is talking about when he talks about shad fishing and the habits of shad.

A. N. CHENEY,
State Fish Culturist.

THE FISHING FLEET OFF SHORE.

Trout Fry and Trout Fingerlings.*



MAKING A LANDING.

WHEN the science of artificial fish propagation arrived at that degree of perfection that ninety-five per cent of trout eggs spawned and impregnated in an earthen pan hatched young fish, man believed that this was a great improvement upon nature's methods, though little or nothing was known of the percentage of young fish obtained under natural conditions. This claim was a valid one, as subsequent investigation proved, when an actual count of some salmon eggs deposited by the fish naturally in a Canadian salmon river disclosed upon actual count that but two per cent of them were impregnated. For more than 100 years after the first trout were hatched artificially in Germany, public fish culture was confined to hatching trout fry and to planting them as fry. Then another but minor revolution occurred in this particular field and trout fry were reared in the hatcheries to the stage now called fingerling fish. While this was a stride in advance, it was not

* This article was originally prepared for *Outing*, and with some slight changes is used in this report with the consent of the editor.

so marked as the hatching of fry in the little troughs of Stephen Ludwig Jacobi in Varenholtz in 1741. However, when it was demonstrated that fish could be successfully reared in the hatching troughs or rearing races to 8, 10 or 12 months of age, the fry so gladly welcomed in other years became a drug in fish culture, almost despised for public planting, and the popular demand was for fingerling or yearling trout, because it was claimed justly that greater results were obtained from planting the larger fish, as they were subject to fewer casualties than the baby fry.

Let us look into the development of a brook trout from the egg to babyhood, first under natural conditions and then in a hatchery where man improves upon nature It is in the autumn that a "livelier crimson" comes upon the sides of the male brook trout to indicate that the mating season has arrived, and the more quietly colored female makes her way to some point where the current ripples over the graveled bottom of the stream which constitutes the home of the pair. Sand may have lodged amongst the pebbles or drift may have covered them, but the female trout hangs motionless in the water, head upstream, the fins only fanning gently, over some particular spot that she has selected, until suddenly, quicker than the eye can follow the details of the movement, she partly turns on her side, makes a flirt with her tail, and then rights herself while a small cloud of sand passes down stream behind her. This motion is repeated again and again and the spot grows brighter and larger, circular in form, until a saucer-like depression is made with the larger pebbles paving it from center to circumference. During her labors of preparing the bed that will later receive her eggs, she has not been without offers of assistance, for the more gaudy hued male trout have hovered about and occasionally entered the depression in the gravel, to be unceremoniously dispossessed or routed after a charge that appears to be viciously vigorous. Often the female will seize the male in her mouth and give him as near a shaking as one fish can give another, or nip him fore and aft to express her disapproval of his presence at that juncture.

The males, too, fight among themselves for the favor of a female, but when the spawning bed is fully prepared the favored male takes his place beside the female, and together they quietly fan the water with their fins, until the time comes, when with a tremendous motion of body and fins extending from head to tail, the female expresses from her ovaries her amber-colored eggs, while the male fish extrudes the milt necessary to impregnate them. During the operation of spawning the pair may turn on their sides or rise into an almost erect position, but the result is the same whatever the positions they assume. The eggs are heavy and non-adhesive, and sink to the bottom of the depression, called the spawning bed, and such of them as come in contact with the particles of which the milt is made up are vivified. The current

may be strong enough to carry away some of the milt before the eggs touch it, or for other reasons the contact may be very imperfect, although the depression in the gravel acts after the manner of an eddy in the water once eggs and milt drop below its edges, and it is for these reasons that the impregnation of the eggs is imperfect and the percentage low in natural impregnation.

The eggs being deposited in the gravel, fertilized and unfertilized alike, are covered over by the fish and left for nature to work its will. Trout spawn from October to January, and even later in some waters, and after one pair of trout have selected a spawning place, prepared a bed and deposited eggs, an operation which may take several days to complete, another pair spawning later may select the same place and uncover the eggs in preparing a new bed. The new comers may eat the eggs of their predecessors before the female is ready to deposit her own ova, but should the original bed remain unmolested by other trout, eels may burrow into the gravel of the bed and destroy the eggs; insect larvæ may feed upon them; drouth may come and the water recede uncovering them and exposing them to frost and destruction; floods may visit the stream, bringing down mud and drift covering the beds and burying the eggs beyond hope of hatching at the appointed time; fungus, a parasite always to be dreaded at all stages of fish life, may appear and destroy them, and other casualties may occur to reduce if not to obliterate the entire deposit of eggs. The impregnated eggs that escape the various enemies and adverse conditions always contending against them, may hatch in 45 days or they may not hatch for 150 days, depending entirely upon the temperature of the water; the colder the water the longer it takes to hatch the eggs. When the embryo trout has broken the shell of the egg and emerges from this envelope that has confined it coiled up, it has a large yolk sac nearly as large as the fish itself, and upon this sac it feeds by absorption for from 20 to 30 days, the time again depending upon the temperature of the water; the colder the water the longer it takes to absorb the sac. This sac practically anchors the baby trout to the bottom of the stream, though it does make spasmodic efforts to swim before it has been hatched many days, but usually the little fish cluster behind some stone or obstruction in the bottom of the stream, which breaks the force of the water and creates an eddy below it. During the time that the little trout or fry are growing, nourished by absorbing the sac, they are practically helpless and a prey to everything in the water that may desire to feed upon them; larger fish, water snakes, insect larvæ, ducks, kingfishers, frogs and an army of finned, winged and furred enemies, until it is a wonder that any are left to grow to fingerling fish. So much in brief for nature's method in hatching trout fry.

In propagating trout by artificial means the time is the same naturally, but the place is different, and the manner will hereafter be shown as briefly as in the case of nature's methods.

The stock fish are confined in ponds, and there may or may not be spawning races leading into the ponds. At one time it was considered best to provide such races, but it is no longer considered absolutely necessary. If spawning races are used a bag net is fixed at the lower end of the race after the fish have entered, and by lifting the covers of the race the fish are driven into the bag, the extreme end of which is tied with a string. The bag is lifted over the tub, the fish untied and the fish slide into the tub. The races are merely shallowed boxes covered, and with gravel at the bottom through which the water flows to feed the pond containing the fish. As the fish are seized with the breeding instinct they make their way into the races and fan the gravel as in the case of wild fish in wild waters. This serves only as a signal to the fish breeder that the fish are about to spawn, and he thereafter directs the spawning operations, believing for once, at least, that man's methods are superior to those of Dame Nature in some of the details of reproducing members of a class of the animal kingdom, and of these details it is surprising that in this day and generation so many people, interested generally in fishing matters in a broad sense, should be absolutely ignorant as they are practiced in a hatchery, and this is sufficient reason for dwelling upon these here. The trout in a hatchery pond, having by their actions given evidence they are ready to spawn, are netted and placed in tubs filled with water by the side of the pond, and the spawn taken with a supply of shallow tin pans. His assistant, the net and the tub, may be seen in the accompanying illustration, the drawing being made from life and so accurate that the two men will be readily recognized by any one who has seen them at one of the hatcheries belonging to the State of New York. It is not necessary to separate the fish, the males in one tub and the females in another, even if some of the books so direct, as I believe they do. In taking eggs by the dry process, the discovery of Vrasski, a Russian fish breeder, though credited at about the same time to an American who very frankly declares that he simply read of Vrasski's method in a French journal, and practiced it, the pans are dipped in water and the water poured from them, having them moist and free of dust. The female trout is taken from the tub and held over the pan in the manner indicated in the illustration. Then slide the hand down the abdomen over the ovaries with a gentle pressure, at the same time bending the body of the fish, and if the eggs are ripe they will flow freely. No force should be used. If the eggs do not come under gentle pressure put the fish back and try another.

When the eggs of two or three females have been secured take a male fish and expel the milt in a similar manner, but the pressure should be applied lower down, nearer to the vent. In comparison to the bulk of eggs little milt will be secured from a male trout, though it will be sufficient to impregnate the eggs of several females. A skillful operator will readily distinguish the sex of the fish, the males are generally slim-bellied and of a higher color than the females, and, too; a skillful operator will distinguish a ripe from an unripe fish from the touch, as the ovaries of the latter are

SCENE AT A NEW YORK STATE HATCHERY.

harder or more unyielding than the former. The eggs when they first come from the fish are soft because of an outer coating or envelope, and they stick to everything and to one another owing to an absorbing process through the orifice or micropyle in the envelope. Placed in water alone the eggs would absorb water and fail of impregnation, though milt were afterwards added. The milt is composed of infinitesimal spermatic particles, and when it is added to the pan of eggs one of the zoosperms finds the orifice during the absorbing process and impregnation takes place. Milt placed in a bottle remains active for several days; when it touches the water it

dies in two minutes, and yet when the milt has been added to the pan of eggs a little water is then added to both to make the zoosperms more active and the pan is tilted from side to side that the eggs may draw in not only water, which plumps them, but a spermatic particle as well. During the absorbing process when the eggs are "set" by sticking to one another and to the pan, the eggs may be impregnated, but not often absorption ceases, for then no power can fertilize the eggs if a zoosperm has not found a micropyle. After tilting the pan to aid impregnation more water is added and the pan of eggs is placed apart to separate, and this takes a longer or a shorter time, depending upon the temperature of the water, say from ten minutes to half an hour, separation meaning that absorption has ceased and the eggs are free from one another. The eggs are then washed thoroughly, for an excess of milt which will sour may cause fungus, and are ready to be placed on the trays in the hatching trough. In this, the dry process, one hundred per cent of eggs can be impregnated, if the eggs are all perfect, and it is common to impregnate ninety-five per cent. In the wet process, practiced before Vrasski made his discovery, the method was the same as the dry, except that the pan was first filled half full of water. By the wet process fifty to sixty per cent of the eggs taken were impregnated.

With the eggs placed on the trays and running water provided in the hatchery troughs, man is second to nature in their development. The dead eggs must be removed, fungus guarded against, and care exercised that no sediment covers them. The living enemies of trout eggs are not to be feared if the troughs are covered so that they find no entrance. The eggs may hatch in 45 days, or they may require more than 100 days (in Canada salmon eggs have been 210 days in hatching), the time being dependent upon the temperature of the water, as already stated in the case of eggs deposited naturally. The young trout with umbilical sac attached is called an alevin; if one wishes to be very precise and distinguish this stage from the next, when the sac is absorbed and the little fish becomes trout fry. During this period the alevin is sustained by absorbing the yolk sac, but before it is entirely absorbed it begins to feed through the mouth, and if the fish are to be planted in wild waters as fry, this is the time to make the plant, that the fry may early become accustomed to their new home and the food it contains. The fish are very hardy at this period and bear transportation well. As alevins the little trout gather in masses in their endeavors to hide or get under something which will cover them, and if the construction of the troughs would permit many would smother, but as the crowding is chiefly to avoid the light the boxes or troughs are covered to exclude it, and cause the little fish to separate.

It matters little whether the fry which are to be reared to fingerlings are fed in boxes in the trough (the difference betwen a box and a tray in the trough is that the mesh of the wire bottom of the box is finer and the sides and ends are higher), or in the trough itself, or in specially constructed rearing boxes in the hatchery, which are as long as the troughs, wider and deeper, with gravel bottoms, as eventually they will or should all go into rearing races or ponds outside the hatchery. As the fry begin to feed they turn their heads up stream against the current, and are more evenly distributed through the water. If they nibble the tails of one another fungus will appear, and salt is put into the trough at its head as a remedy. Fry are fed five or six times each day on ground beef's liver, diluted with water to the consistency of cream, and the object is to give the little fish all they will eat without leaving a surplus of food to foul the box or trough, and thus be the cause of disease which may carry them off. As they grow they are fed less often, and the liver is no longer diluted, but given to them as it comes from the grinding machine, but overfeeding is always to be guarded against for the reason given, no matter what the age of the fish may be.

It is not the object of this paper to go into the details of rearing trout fry in a hatchery, with a recital of all the obstacles to overcome before the fish arrive at the fingerling stage, the diseases they are heir to, and the constant care they require at the hands of the hatchery attendants, and, therefore, scant reference is made to hatchery management, but enough has been said to show that vigilance is the price that must be paid to insure healthy fingerling fish at the end of the first season. Hatchery tools can be shown more clearly than described, and they are tweezers of wood with ringed ends for picking out dead eggs, small nets for lifting fry, a feather to move the eggs and a brush to clean the trough and trays.

A "fingerling" trout is planted when it is about eight months old, and it may be two and a half inches in length or it may measure six inches. Trout at six months of age have measured six and a half inches in length, but this is exceptional. Of a lot of trout hatched at the same time from a tray of eggs taken all on the same day, some will grow much faster than others, the strong active fish receiving the greater amount of food and crowding the weaklings on one side, for it is abundance of food which makes size in trout. It is the unequal growth which causes the fish breeder to sort his young fish into ponds of large, medium and small fish of same size. There are two reasons for this: If not sorted the larger trout would eat the smaller, and after sorting the smaller ones grow much more rapidly when relieved of the presence of larger more vigorous fish. If the trout are sorted at six months of age the smaller fish may be grown so rapidly by proper feeding as to almost equal the size

of larger trout when both have arrived at the yearling stage; so it is of the utmost importance that young trout, in confinement, have every attention paid to their food and feeding if they are to be grown to large fingerlings.

It has been noted in this paper that the modern demand in public and private fish establishments is for fingerling or yearling fish and that fry are no longer held in esteem, as formerly, for planting, and while it it true that better results may be obtained from planting the larger fish, there is a misconception in the public mind in regard to the relative value of the two sizes of fish. Fry are planted in the spring when about an inch long and just before or just after the yolk sac is absorbed, and fingerlings are planted in October or November when four or five inches long, after being carried through the fry period in the hatchery, the season of warmer water and the season of infant mortality, so that both are planted under favorable water conditions and of necessity the fingerlings are of greater value than fry in the streams planted, but nine times out of ten, if left to the average applicant, the fry and fingerlings are both improperly planted. Yes, in the case of fry they are improperly planted ninety-nine times out of one hundred, and one per cent is a high estimate of rational planting. The Hudson River was stocked with salmon (*Salar*) fry alone, with the result that over 300 adult salmon were taken (illegally) in the shad nets in one season. The salmon fry were planted in small streams of the headwaters and there remained for two years before going down to sea as smolts (fingerling salmon), and in two years more the adult fish returned weighing from 9 to 15 pounds each, having been subjected to all the dangers to fish life in fresh and salt water, so that it is folly to say that good results cannot be obtained from planting the fry of the trout.

It is strange, perhaps, but a common objection to the planting of fry in the spring on the part of applicants is because the water is too cold in the streams, for the water in the cans which take the fry from the hatchery to the streams is just as cold if not colder, for almost always ice is used in the cans in transporting both the fry and the fingerlings. Another objection is that the water in the streams is so high that the fry are "washed out" and lost, whatever that may mean, but it is as absurd as the other objection. If fry are properly planted they will not suffer from cold water, they will not be washed out and they will produce good results.

To be properly planted, fry must be taken to the headwater rivulets tributary to the stream it is wished to stock, and there they must be thinly distributed so that the food supply will not be at once exhausted, as would be the case if the little fish were bunched in one place. In the rivulets the baby trout are removed, comparatively, from the enemies which would prey upon them in larger waters, and if planted

sparingly, over a considerable distance, all will find sufficient food to sustain them until they grow and drop down to fresh pasturage. A daily newspaper in central New York had on its front page last spring a large illustration of how baby fish are planted. The legend should have read "How baby fish should *not* be planted." The illustration was from a photograph, and men were shown in the act of turning trout fry into a great, raging stream like a young river, and the empty cans proved that some 20,000 or 30,000 trout fry had been dumped in that current in one spot. There had been no attempt to follow nature by going to the headwaters, as the spawning trout would have done, and the fish had not even been distributed so that the survivors that escaped the maws of their larger brethren lying in wait would have had a slight chance to get one or two meals before they starved to death for lack of food. The man who made the planting that was photographed will doubtless report later that fry are not suitable for planting. They are not, nor are fingerling or yearling, if those who do the planting will not take the trouble to plant them properly — removed from their enemies as far as possible, and where food abounds. Trout need food as much as a cow, a horse or a man, and will not thrive in its absence. Trout do not live on water any more than man lives on air.

The public hatcheries cannot rear to the fingerling stage all the fry they can hatch for lack of water. Fifty gallons per minute, of water below a temperature of 60 degrees Fahr., will carry 100,000 trout to the age of four months, but from six months of age to a year the same number of fish should have 200 gallons of water per minute, and it will be readily seen that some portion, and a large portion at that, of the annual output of the hatcheries must be planted as fry, but in planting artificially hatched fry there is a distinct gain over nature of ninety per cent in the number of fry hatched. No one can tell the per cent of fry that survive and grow to the fingerling stage in a wild state, but in a hatchery eighty-three per cent of a certain lot of fry were reared to yearlings. On the other hand, in distributing fingerlings, a public hatchery will ordinarily grant an applicant 1,000, but if the same applicant should ask for fry he would probably get 10,000, and 10,000 trout fry properly planted will produce better results than 1,000 fingerlings improperly planted. If fry and fingerlings are both properly planted there is no doubt that to produce the same result many more fry than fingerlings must be used, but in either case much depends upon the manner in which the fish are planted.

A. N. CHENEY,
State Fish Culturist.

SHIPPING FISH TO MARKET.

Fish Represented in the Colored Plates.

By SHERMAN F. DENTON.

The Canadian Red Trout.

THE Canadian red trout from the chain of red lakes in St. Alexis des Monts, P. Q., of which two figures are here given, is closely allied to, if not the same species as, *Salmo Marstoni* from Lac de Marbre. It is thought likely it will turn out a new species if the ichthyologists can procure enough material to settle the point.

This trout is certainly a very handsome fish and probably grows to a good size. The larger specimen from which the drawing of the adult fish was made would probably weigh a pound, and it doubtless grows much larger. By comparing the figure of this fish with the one of the Sunapee trout figured in a previous report a good many points of similarity may be noted.

In a future report a more detailed description of the Canadian red trout and its habits will be given.

The Bullhead.

The bullhead or horned pout is distributed over a large part of the country, and there is hardly a pond or stream in the Eastern or Middle States which contains mud but is well stocked with this fish. By some it is esteemed an excellent fish for the table, while others regard it as scarcely fit for food. The muddy waters and the food on which the fish subsists may have a good deal to do with the flavor of its flesh. The bullhead is largely nocturnal in its habits. During the daytime it remains hidden away in holes in the bank or in the mud on the bottom of the stream or pond and comes out of its retreat toward evening. It will take almost anything in the way of bait—worms, small fish, or even salt pork making good lures, and little skill is necessary to capture it. The breeding habits of the fish are interesting. Both sexes watch over and take tender care of their eggs and young. One may often see among the low-water plants in shallow water many thousands of the young bullheads, huddled together, looking like a black cloud surrounding the parent fish. She lies among them looking as gigantic as a whale might in a school of menhaden. Woe betide the perch or pickerel who tries to make a meal on the young, for the sharp and poisonous spinules of the adult fish are ever ready for use.

The White Perch.

The white perch is a fish usually inhabiting brackish waters, although it has been introduced into many of our interior ponds and lakes, where it thrives and multiplies. It varies in color from fishes with light silvery sides and olive green on the backs to specimens which are very dark, in fact almost black. In clear, sandy ponds it is frequently a very beautiful species, and its iridescent sides have much of the glitter of the mackerel and menhaden. When food is abundant the white perch grows to a good size, ranging in weight from one pound up to three pounds. It is a sweet and toothsome fish, and being also a gamy fighter when hooked, is a favorite with anglers. The bait used for it is the minnow and shrimp, although it will often take the angle-worm. White perch are gregarious, and many may sometimes be taken from the same school. Evening seems to be the best time of day for their capture, and from just before sunset till an hour after they may usually be fished for with success. At times, however, they refuse to take food of any kind, and it is sometimes very tantalizing to watch dozens of large fish in a school swim leisurely past one's bait, not even deigning to look at it.

The Large and Small Mouth Black Bass.

The large-mouth black bass and the small-mouth black bass are justly celebrated by anglers as being among the finest of our fresh-water game fishes. They closely resemble each other, but may be easily separated by those who will take the trouble to examine them carefully. The large-mouth, as its name implies, has a large, wide mouth, the maxillary extending behind the eye when the mouth is closed, while in the small-mouth this bone is shorter and the mouth a good deal smaller. Along the sides of the large-mouth is a somewhat obscure dark green stripe running from the end of the gill-cover to the butt of the tail. The small-mouth, on the contrary, has no such stripe, but is marked by vague bands running up and down along its sides, and has three distinct dark markings running from behind the eye across the gill-covers. In habits these fishes vary a good deal, the small-mouth preferring gravelly or rocky bottoms, while the large-mouth often live over weedy or muddy bottoms. The small-mouth, when hooked, fights desperately, frequently jumping out of water to free itself from the hook. The large-mouth, although a good fighter, is less active and seldom breaks the water. The introduction of these fishes into the various lakes and rivers of the Eastern and Middle States from their home in the Great Lakes and the rivers of the South and West, has been a great boon to the anglers, for within an hour's travel of our great cities one can enjoy good sport with these two fishes.

As food fishes they are variously estimated, some declaring that they are of poor flavor and not so good as the yellow perch which frequently inhabits the same waters, while others pronounce them sweet and juicy and in every way a first-class fish for food. Personally I am exceedingly partial to the black bass, both as a game fish and for the table. Probably a good deal depends on the cooking. A black bass

HAULING LOBSTER POTS.

should be skinned, as the skin when scorched in broiling or frying has a bitter taste. There are few fishes more to my liking than a two or three pound black bass which has been skinned and split, broiled over a hot fire and served dripping with butter.

The small-mouth rarely reaches a weight of more than five or six pounds, but the large-mouth, which naturally inhabits rivers and lakes in the South and is there known by the name trout, sometimes attains a weight of fifteen or eighteen pounds. Professor Gill gives an interesting account of the nesting habits of these fishes, and as it is in every way better than anything I could write on the subject, I give it here:

"The black basses, like the other members of the family, prepare nests and take zealous care of the eggs and young. The sexes begin to pair about the commencement of hot weather. They then select suitable spots for their nests, usually upon a gravelly or sandy bottom, or on rocky ledges, in water from eighteen inches to three feet in depth in rivers, and from three to six feet deep in lakes and ponds; and, if possible, adjacent to deep water or patches of aquatic plants, to which the parent fishes retire if disturbed. The nests are circular, saucer-like depressions, ranging from one to three feet in diameter or about twice the length of the fish. They are formed by the bass fanning and scouring from the pebbles all sand, silt and vegetable debris by means of their tails and fins and by removing larger obstacles with their mouths. This gives to the beds a bright, clean and white appearance, which in clear water can be seen at the distance of several score yards. When the nests are thus prepared the females deposit their eggs on the bottom, usually in rows, which are fecundated by the male and become glued to the pebbles or sticks contained therein. The eggs are hatched in from one to two weeks, depending on the temperature of the water, but usually in eight or ten days."

To sit in a boat fishing for bass on one of our quiet lakes early on an autumn morning while the streaks of mist slowly rise from the water into the crisp air, with the brilliant tints of the changing foliage reflected in the quiet waters, is a pleasure which many a tired man in his office looks forward to with longing.

The black bass is a voracious feeder, pursuing and capturing many of the smaller fishes which, with it, inhabit the same stream or lake. Frogs, minnows and crawfish make excellent bait for this fish, and it will readily rise to the artificial fly at certain seasons.

The Striped Bass.

One of the largest and finest of our food fishes is the striped bass. It sometimes reaches a weight of from forty-five to seventy-five pounds, but these large specimens are rare. Many are taken in nets and pounds, and not a few are caught by the amateur fisherman with rod and reel.

The striped bass lives on rocky bottoms, usually near land, in schools of a few individuals. It is often very fastidious in its tastes, and those who know the fish realize how difficult it is to tempt the fine old denizen of the pools to take the hook. To capture a forty or fifty pound striped bass with rod and reel will tax the nerve, skill and strength of the most experienced, and even a ten or twelve pound fish can make a very gamy fight.

The fish often ascend streams of fresh water and pass the winter in lakes. Its natural food is small fishes, squids, crabs and shrimps. One of the most killing baits for it is the sand eel. Its flesh is firm and of fine flavor, so that the fish is highly esteemed by epicures.

The Bluefish.

A voracious tiger of the seas is the bluefish. This fish, like the Spanish mackerel, is very variable in its appearance along our shores, but has of late years been abundant as a summer visitor. It often reaches a weight of from twelve to fifteen pounds, but the average size is much smaller, the larger fishes being taken in the North late in the season.

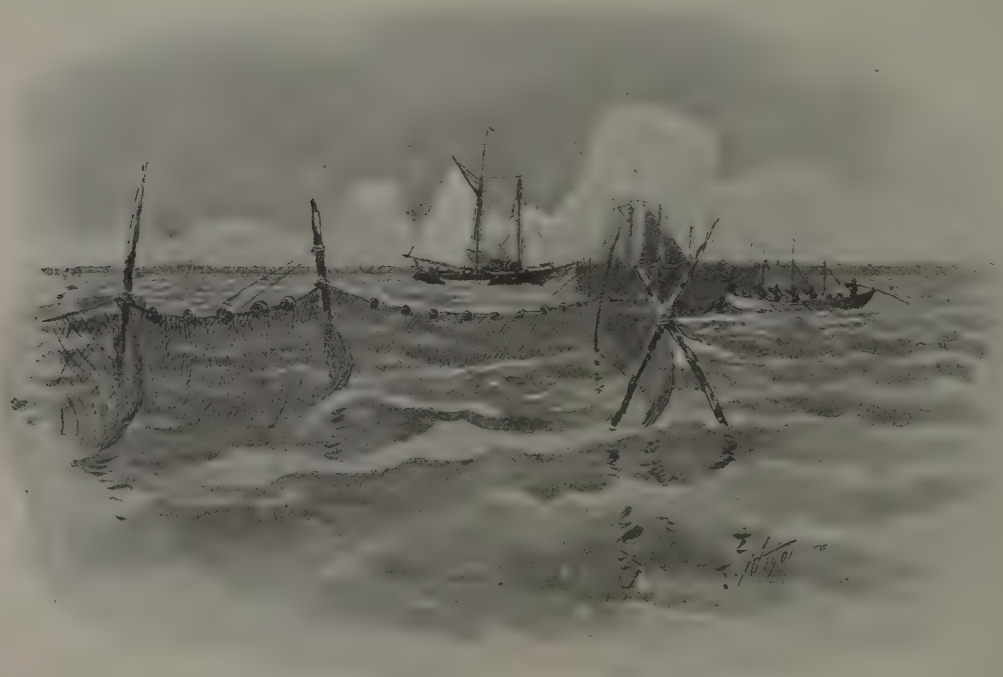
The bluefish is pelagic and gregarious, and moves about frequently in large schools. It is unrelenting in its pursuit of the herring, menhaden and mackerel, and when feeding the water is frequently covered with the oil and stained with the blood of its victims. One may sit in a dory on a calm day and watch the murderous work go on. A number of bluefish will make a rush among a school of menhaden and bite them into fragments seemingly just for sport. In fishing for this voracious creature almost any light-colored object may be used for bait if it is pulled swiftly through the water. A common bait used by the market fishermen is an eel skin pulled over the lead sinker with the hook at the end. A strong line and hook with a copper or brass wire leader is necessary for its capture. When the bluefish are abundant and biting well, it is excellent sport to sit in the stern of a swiftly sailing boat trolling for them. As the fish strikes he frequently jumps out of water, and it will tax one's ability to keep a tight line and land a large fish. Near the mouths of rivers the bluefish is often taken from land by throwing the well-weighted line as far out as possible and pulling it rapidly in. One needs to use some caution in extracting the hook from the mouth of the bluefish, as one snap of the powerful jaws and cutting teeth might well disfigure one for life. I have seen a piece of cloth as large as the palm of my hand bitten with one snap of the jaws of this fish from a person's clothing. It is not uncommon to hear of a person losing a finger by the same means. It is always safe to use a club on the struggling fish and extract the hook afterwards.

As a table fish this species is rated among the best. It is often broiled, but for a large fish it is unsurpassed when stuffed and baked.

The fish spawns in bays and inlets in the South, and the young fish four or five inches long may be taken about the wharves in the summer and autumn.

The Spanish Mackerel.

A fish which is highly prized and brings good prices in our markets is the Spanish mackerel. It is a slim fish with a pointed head and flattened sides. It visits our coasts during the summer, and is found from Cape Cod southward. It is a shy and difficult fish to capture, frequently refuses to take bait of any kind and keeping away from boats and nets. It is sometimes seen in immense numbers moving swiftly along near the surface of the water. This species is very variable in its appearance and some seasons is plentiful, though during several years in succession it may not visit our coast at all. Fine specimens of this fish are sometimes taken while trolling for bluefish and kingfish. It is a marvel of iridescent brilliancy when first captured.



AT THE TRAPS.

Five Well-known Game Birds.

By HARRY C. OBERHOLSER.

THE last few years have witnessed an unprecedented revival of interest in game and game protection; and as one of the direct results, there has arisen an apparently ever-increasing demand for more and accurate information. With the purpose of presenting an account of a few of the better known and more widely distributed of our water birds and shore birds, five have been selected for special treatment here, as follows: The canvasback duck, the dowitcher, the greater yellowlegs, the black-bellied plover and the American golden plover. While of necessity this description must be brief and of course very far from exhaustive, it is aimed to give the salient facts of each bird's life history, around which further details quite naturally group themselves. It is entirely superfluous to state that not of even the most common bird does the naturalist claim to possess full information; and should this article perchance stimulate some one to closer and further investigation it will have fulfilled its purpose.

A TILLER OF THE SOIL—THE WOODCOCK

The Canvasback.

So well and so widely known that its very name has passed into an epicurean proverb, the canvasback needs no introduction. Of the fickleness and caprice of popular favor this duck is a most illustrious example; for, while it occu-

pies a conspicuous place in the esteem of the connoisseur of palatal delicacies, many a one has greater claim to such honor. In fact, except under certain unusual circumstances, the flesh of this greatly over-estimated bird is decidedly inferior to not a few others of its kin, whose lack of notoriety has caused them to be less eagerly sought, and has spared them from wholesale destruction. But however unwarrantably esteemed the canvasback may be, it is nevertheless still invested with more than ordinary attractiveness to the sportsman and the naturalist.

It is strictly a North American species, ranging at large over the continent, from the shores of the Arctic to Southern Mexico and Guatemala, and along the coasts of both the great oceans, passing its summer sojourn and bearing the burden of its household cares in the solitudes of the great interior, from the States of the Northwest to the valley of the Yukon. In the extreme southern part of its range the canvasback is never numerous, and along the coast of the North Atlantic it is of rare occurrence, while in New York State it is, generally speaking, far from common. Although in many parts of the Middle and far Western States it can be counted as a species of frequent appearance, yet there is probably no region that can justly lay claim to being a greater winter rendezvous than Chesapeake Bay and its tributary streams. When the months of October and November bring from out the northern wildernesses the hordes of migrant ducks and other wild fowl, the canvasbacks appear, and in countless thousands cover the waters of river-mouths, bays and estuaries along the Chesapeake. Such at least was the spectacle in early days, before the insatiable appetite of the gourmand and the avarice of the pothunter, through decades of persistent persecution, had so greatly thinned their ranks.

The great attraction this place holds for the canvasback is the extensive growth of a certain kind of water grass, called variously "tape grass," "wild celery," and, from serving for food to wild fowl, also "duck grass." This plant, the *Vallisneria spiralis* of botanists, grows in the shallow fresh and brackish water of many of the streams and bays along the Atlantic coast, but nowhere in greater profusion than about Chesapeake Bay. This plant seems to be the favorite food of the canvasback, and wherever accessible is eagerly sought. It grows in comparatively shallow water, but as its root is the morsel held in esteem, it must be obtained by diving. So forcibly, indeed, did this peculiar predilection for this particular food strike the original describer of the canvasback that he commemorated the fact by taking part of the scientific name of the plant for the duck's specific name. It is this diet that imparts to the flesh of the canvasback the requisite delicacy of flavor; and when, after having lived upon this for some weeks, the bird becomes, in the late fall, most fit for the table, it sometimes is so fat that in falling upon the water it has been known to

burst open along the breast. But deprived of this food the canvasback turns for sustenance to that which to great extent nourishes the ducks of the "common herd,"— various other water plants, seeds, mollusks, small fishes and still more insignificant marine animals; becoming then, like many another upstart, scarcely so worthy of regard as many of its relatives which in its day of prosperity were wont to be looked down upon.

Of hardly more than ordinary appearance, the canvasback is, in its native haunts, very much like other ducks. Like most of the larger species its flight is rather heavy, though strong and well-sustained; and though moving somewhat awkwardly on land, its ability to swim and dive is hardly inferior to that of the regular sea ducks. In winter quarters these birds frequent the mouths of the streams and estuaries, their numbers and distribution largely influenced by the food supply. Where the wild celery is abundant these ducks, often in company with other species, swim about the shoals and feed upon the roots, while, it is claimed by some, they leave the rest of the plant for the other ducks to eat. While thus engaged, or when riding asleep on the water, they scarcely ever seem to be without vigilant sentinels posted to give warning in case of danger, at whose first alarm the flock is up and away. In more interior localities they alight to feed in prairie ponds and places of similar kind, ranging in small companies which seldom unite until the season of migration; but along the larger bays, such as the Chesapeake, there is commonly a regular morning and evening movement to and from their feeding-grounds, at which latter place they disperse themselves, only to return at the close of day to the general nightly gathering-ground. During these flights they travel as in migration, in small wide-extending parties of more or less regular geometrical outline, and as they pass projecting points of land offer frequently a fair mark to the sportsman.

The loud roar that is borne on the wind from myriads upon myriads of these ducks as they rise affrighted from the water is indeed an inspiring sound to the naturalist; but to the anxiously toilful hunter, whose chance for game disappears with the rush of pinions, there comes hardly a kindred feeling. For the canvasback is exceedingly shy and wary, and all the stratagem of the duck hunter must be called into requisition if success is to follow. Should the bird be wounded near shore it seeks the high grass for concealment; and if injured in open water dives so deeply and so far that pursuit is well-nigh hopeless. But when the cold of winter has frozen the water of the feeding-grounds, and the available food supply is thus reduced to a minimum, it sometimes happens that large numbers may be killed at a hole in the ice to which they have crowded to satisfy their hunger. When persistently hunted these ducks will desert a particular locality, even though it be a favor-

ite feeding-ground; and this, to no small extent, probably accounts for the great diminution in numbers that has taken place along the shores of the Chesapeake and elsewhere.

The nest of the canvasback is built among the tall grass or rushes along the margin of some pond or lake or stream. It is placed in shallow water, and often rests on the bottom, rising from a bulky base that may be merely a rude pile of grass, though the superstructure of grass and small twigs, with a lining of feathers and down, apparently sometimes from the female herself, is compact and well put together — a good receptacle for the six to ten grayish-green or greenish-buff eggs deposited during its construction.

The male canvasback, when in good condition, weighs at least three pounds, and is nearly two feet in length, with an extent of wing that approximates a yard. The bill is rather long and narrow, thin toward its tip, but sloping gradually back to a high base. The close-feathered head and the neck are reddish-chestnut, the top of the head being somewhat blackish; the breast, the fore part of the back, part of the rump, the upper and lower tail-coverts are black; the sides, flanks and most of the back are white, finely vermiculated with dusky, presenting an appearance that has suggested the name "canvas"-back; the abdomen is pure white. The bill is greenish-black, the eye reddish-brown, the feet lead color. The female resembles the male, but in coloration is duller throughout.

A BUSYBODY — THE KINGFISHER.

Although in superficial appearance this species bears a strong resemblance to the redhead, and in fact is often not discriminated, a careful examination should serve to separate them without trouble. The canvasback has a much longer and narrower bill; much more delicate black wavy cross-markings on the back and sides; and a decidedly darker chestnut color on the head and neck.

The Dowitcher.

Familiar alike to sportsman and naturalist, the dowitcher, or red-breasted snipe, is held in high regard by both, and is, moreover, as happens so frequently of birds, a refutation of that old adage about the contempt-breeding influence of intimate acquaintance. Along the ocean shore of the Eastern United States it is one of the best known of all the various shore birds, in many places being exceedingly abundant; and while of less conspicuous presence in the interior, is even there at certain times and places common and of regular occurrence. Although preeminently a species of Eastern North America, it occurs also, though quite irregularly, in Alaska and some of the Western United States; but of its common distribution the great Mississippi Valley may be considered to form the western limit. It ranges from the shores of the Arctic Ocean to the tropics of Brazil, spending a large part of its yearly life in journeyings to and fro between these widely separated regions; and it sometimes finds itself astray in Great Britain or France. In the course of these seasons of wandering it reaches the coast of the Middle Atlantic States in April and August—during the former, passing with comparative rapidity on its way to a summer home in the far north, but on its return tarrying long by the way. Curiously enough, it has been found throughout the summer in some of the extreme Southern States, but no evidence of its breeding there has been obtained.

This is a bird of many names, as the following, in addition to those already mentioned, bear witness: Gray snipe; brown snipe; New York godwit; brown-back; robin snipe; gray-back; quail snipe; German snipe; driver. Mr. Trumbull explains the name "Dowitcher" as a corruption of the German "*Deutscher*," employed at first to distinguish this, the "German" snipe, from its relative the "English" snipe; and this name, clinging with the tenacity of so many slang expressions, has survived to the present day as one of the bird's best known designations. The confusion which has arisen by failure to distinguish between this species and its western representative, the long-billed dowitcher (*Macrorhamphus scolopaceus*), has caused an indiscriminate application of names that renders it difficult to separate the various accounts of the two.

In habits the dowitcher is rather more like a sandpiper than a snipe, gathering into flocks that often reach great size, and then as at other times evincing a preference for sandy shores or mud flats, rather than grassy swamps, although, particularly in the interior, frequenting the meadow ponds and the boggy margins of small lakes. When in a flock these birds approach a favorite feeding-ground, they alight usually in a compact mass, remain thus for a little time, then scatter about in pursuit of their food, which often they obtain by perpendicular probing in the mud, after

the manner of the woodcock, at this working rapidly and even with the head and part of the neck under water. On the wing they are vigorous and move with surprising celerity, performing in company many extensive and interesting manœuvres. They are very unsuspicious, and permit easy approach within gunshot, so that among these flocks, which not unusually aggregate hundreds, it is possible, over decoys and by imitating their call, to which they readily respond, to commit great slaughter. Even after an alarm, so tame are they and so solicitous for the wounded, that it is of little trouble to recall them within range.

The dowitcher locates its nest along the marshy margin of some small lake, and after the manner of snipes and sandpipers, without any attempt at elaborate architecture, proceeds to arrange a few dead leaves in a slight hollow made in the mossy ground, and makes this to serve for the cradle of its young. The four decidedly pyriform eggs vary much in size, and are drab or somewhat olivaceous, with many markings of dark brown.

IN THE WHEAT FIELD — THE QUAIL.

The dowitcher is somewhat over ten inches in length, with an alar expanse of about eighteen inches; the wing is five and a half, the bill from two to two and a half inches in length. In summer the upper parts are black, mottled with cinnamon and whitish; the upper part of the rump is white, usually with few dusky markings or none; the rest of the rump, the tail and tail-coverts are barred with blackish, the tail much the most heavily; the head, neck and under surface of the body are pale cinnamon, the abdomen whitish, the sides and breast spotted with dusky, the head and neck streaked with the same. In winter the bird is quite different in appearance, having lost almost all the warm brown and cinnamon shades, and being nearly uniform gray, somewhat mingled with whitish, with the abdomen entirely white.

The Greater Yellowlegs.

In the early days of American ornithology that part of the ocean front known as the New Jersey coast, before it was sought by thousands of summer visitors, was a veritable paradise for birds that love the shore. Where now stand great hotels and scarcely less palatial private homes, surrounded by well-kept lawns and ornamented by strange and beautiful flowers, there was then a barren, windswept waste of successive sandy beaches, with frequent inlets to lagoons and creeks bordered by wide marshes of salt grass, and in these solitudes nature reigned supreme. Nowhere, perhaps, is there a more conspicuous example of the changes wrought by the resistless advance of civilization. Conspicuous among the birds that in myriads ranged along these shores was the subject of this present sketch.

Breeding from the Northern United States to the Arctic regions, it reaches, at least in winter, as far to the southward as Patagonia; and hardly an area of notable size exists, from ocean to ocean, where this bird is not found at some season of the year. While it is not known to breed except as above stated, it has been observed in summer in Texas, in Florida, and in the pampas region of Argentina and Uruguay. Could the yellowlegs be endowed with speech, its present reputation leads to the presumption that many of its now mysterious actions would be speedily explained, for our bird bears a stigma that its exceeding loquaciousness has earned — the same that is often applied to people who talk too much, whether they say anything or not — the epithet "Tell-tale." Whether or not justly applied, this name is supposed to indicate that the bird by its cries warns all other game of the approach of the sportsman.

The greater yellowlegs is fully as common in the interior as along the coast, and frequents the muddy shores of ponds, lakes and streams in search of insects, worms, crustaceans and small fishes. In pursuit of these it has at times a peculiar habit of running rapidly along through shallow water with its bill under the surface, which action impresses the beholder more as a matter of sport than of anything more serious. Sometimes several individuals take part in this performance, one behind the other. In small flocks or singly this species mingles freely with other waders, and at times accepts the society even of the smaller ducks. When on the wing it is easily called by imitation of its clear whistle. As it alights upon flat or shoal it raises its wings straight into the air for a moment or two, as though stretching, or as if feeling insecure of its footing, and when a whole flock perform the same movement simultaneously, the effect is curious and pleasing in the extreme.

The nest of this species is an inconsequential affair of grass, sunk in the ground in

the marsh, and contains usually four eggs, grayish-white in color, with markings of brown and lilac.

The greater yellowlegs is fourteen or fifteen inches long and about twenty-five in extent; the wing is about seven and a half, the bill two and a quarter inches in length. The upper surface is blackish, variegated with white and grayish; the crown and hind neck are grayish-white, streaked with dusky; the upper tail-coverts are white, irregularly barred with the same; the middle tail-feathers are grayish, darker barred, the remainder of the tail white with dusky bars; the sides of the head and neck, with all the lower parts, are white, the breast, sides and flanks transversely marked with dusky, the throat and abdomen unspotted, but all the rest streaked with dusky. The bill is black, the eyes brown, the legs and feet deep yellow.

The Black-bellied Plover.

Distinguished in appearance, and animated though dignified in movements, the black-bellied plover never fails to be attractive. Though of almost world-wide distribution, it is more numerous in the northern hemisphere. In America it ranges from the Arctic regions to Brazil and the United States of Colombia, breeding, so far as known, only near the margin of the far northern ocean. It is most abundant along the sea coasts, though found also in the interior, particularly about the Great Lakes, occasionally as well congregating in thousands along some of the inland streams. On its northward journey it passes through the Middle Atlantic States in May, and when southward bound reaches the same region in August. Some of the birds pass the winter in the Southern States, but most of them probably do not sojourn so far north at this season. Individuals have been found in Florida during the summer, but without indication of breeding.

The whistling plover, beetle-head, or bull-head, as this bird is variously known, is quite fond of the society of its relatives, and often is to be seen feeding in company with such species as knots, turnstones, red-backed sandpipers, golden and ring-necked plovers. As a rule, the black-bellied plover moves in considerably smaller companies in spring than in autumn, and when on the wing moves strongly and swiftly, often in straggling array, or in lines much like some of the ducks. As a favorite resort may be mentioned the extensive sand flats along the shore, where in the shallow water this bird seeks its food of insects and small shell-fish; but it also frequents the muddy margins of the marshes, as well as the close-cropped or sparsely grassy uplands adjacent, and is often active long after darkness has fallen. It is said at times to turn over and over in the air like a tumbler pigeon, and evidently for similar reason. Whether on the wing or patrolling the sand flats this bird is ever on the

alert, and experienced indeed must the sportsman be who can with any marked degree of success allay its ever-present suspicion. The clear, liquid, several-syllabled call note is not difficult of imitation, but the bird does not always respond.

This species builds its nest of a small quantity of grass and leaves, which serves hardly more than for a lining to the depression in the ground where the eggs are laid. These are four in number, of the usual pyriform shape, and greenish or ochraceous drab, with markings of dark brown.

The length of the black-bellied plover is about eleven and a half inches, its extent of wing twenty-five, the length of wing seven and a half inches, the bill somewhat over an inch. The head above the eyes, the hind neck and its sides are white, the first with some blackish feathers; the back is black with markings of white; the wings are brownish varied with white; the upper tail-coverts are white with irregular blackish bars; the tail is white, barred with blackish; the entire lower surface, with the exception of the white lower abdomen and tail-coverts, is deep black. The young are similar, but are yellowish spotted above, and lack the black of the lower parts, this replaced by white, the breast being streaked with brownish.

The American Golden Plover.

This beautiful plover, so well named the golden, replaces in America its namesake of the Old World. Passing the summer season near the shores of the frozen northern sea, it migrates in fall to the southward throughout all of North and South America, and reaches at last even the bleak shores of Patagonia. On the wonderful pampas of Argentina it occurs at times in untold numbers, though in these latter days much less abundantly. While common, even abundant, over almost all of its range, it does not seem to be very numerous along the Pacific coast. Particularly in the interior it comes in greatest throngs during the autumn, but neither then nor in the spring does it tarry long. In its fall movements along the eastern coast of the United States it often performs long flights without rest, passing to seaward of the shore, from Nova Scotia to the Bermudas and the West Indies, on its way to South America, and appearing in large numbers on our coasts only under stress of severe and adverse weather conditions.

Both in appearance and disposition it is more attractive than its black-bellied cousin. Unlike that species it seems rather to shun the wet ground, having preference for dry flats, sandy uplands, or any areas not covered with high vegetation. Very swift on the wing, these birds, when in flocks about their feeding-grounds, execute movements as perfectly in concert as if they were winged soldiers. When in migration flight, they travel not uncommonly in long lines and in flocks of other

shapes that resemble those of ducks and geese. Often as they alight upon the ground their wings are raised high over their backs before being folded into place. The note of this plover is a mellow whistle, which during the breeding-time is successively repeated and varied until it forms a veritable song. Much less wary than the black-bellied plover, this species is readily decoyed by the imitation of its note.

The nest of the golden plover, like that of most waders, is a slight affair, consisting merely of a depression in the ground lined with a few dead leaves. In this are deposited the four eggs, which are greenish or ochraceous, spotted with dark brown, more heavily about the great end.

In plumage the American golden plover is very much like the European species, except that the lining of the wing is smoky gray instead of white. It is about ten inches long, some twenty-two in extent, with the wing about seven inches, the bill somewhat less than one inch in length. The upper parts are dark brownish with numerous irregularly circular spots of golden yellow and some of ashy white: the lower surface is entirely black excepting the under tail-coverts, which are mixed with white; the tail is dark brown, irregularly barred with whitish; the forehead, sides of the head above the eyes, and the sides of the neck are white; the bill is black, the legs dark brown. Young birds are similar, but lack the black of the lower parts. This species in any plumage may be at once distinguished from the black-bellied plover by the absence of any indications of a hind toe.

EARLY MORNING.

Balanced Aquaria.

By L. B. SPENCER, of the New York Aquarium.

A BIT FROM A SALT WATER AQUARIUM.

IT is nearly thirty years since the writer saw for the first time a balanced aquarium. It was in the home of a friend who was very much interested in the study of natural history, and very enthusiastic on the subject; I cannot realize how one could refrain from the same feeling; for, compared to the first cost and maintenance, a person will receive more instruction, pleasure and recreation from either a fresh or salt water balanced aquarium than in any other way, provided the person cares for natural history, as studied from living animals. Another source of benefit to the possessor of an aquarium will be derived from collecting the animals and plants for stocking it. The collector will require a small hand net with fine meshes (one with a jointed handle is more compact) and a tin pail with a perforated cover. I would advise inexperienced persons to begin with a fresh water aquarium, as it is the easiest to manage. Glass jars from one to twenty gallons are made expressly for aquaria; those with perpendicular sides are best; they are easier to keep clean; oblong tanks of many sizes and styles are made, and are preferred by some; globes are not suitable.

What is a Balanced Aquarium?

It is an aquarium in which the water is aërated by placing in it growing aquatic plants; the light striking on them produces oxygen, which purifies the water, and

supplies the animal life with air to breathe. The animal life exhales carbonic acid gas, which is what the plants need to make them live and thrive, but they can absorb only a small amount; therefore care must be exercised not to have too much animal life in the aquarium. About once a week add fresh water to supply that lost by evaporation.

How to Start and Maintain a Fresh Water Balanced Aquarium.

Place over the bottom of the aquarium, gravel of about the size of "bird gravel," of sufficient depth to cover the roots of the plants; to prevent them from floating wind narrow strips of sheet lead loosely around the lower end of the clusters of stalks and place them in the gravel, having a sufficient quantity of plants in position, and if you choose, two or three small pieces of rock for artistic effect laid on the gravel. You are ready to fill the aquarium with water. I should not place any animal life in it for a day or two; this will allow time for proper aëration of the water. The next step is stocking with animal life. In many of the streams and ponds of the country can be collected aquatic plants suitable for the aquarium, or they can be purchased from dealers; and from the same sources can be procured the animal life needed. One of the most useful plants is *Sagittaria;* it will increase quite rapidly, and is an all-the-year plant.

There are several species of the *Fontinalis;* all are very pretty. *Valisnaria spiralis* and *Sagittaria* are much alike in appearance; both resemble "eel grass." A common plant is *Anacharis canadensis* and is found over a wide range of country. *Cabomba carolinensis* is a nice plant and does well. For floating plants I prefer *Riccia natans* and *Naias flexilis;* they grow well and are very pretty. There are many other kinds of aquatic plants that are useful if one wishes to use them. In the selection of animals choose quite small ones, certainly of fishes; gold fish thrive and live longest. The short-eared sunfish or "pumpkin seed" and the black-banded sunfish are nice fishes and live pretty well; also very small catfish, and mud minnows; the five-spined stickleback, one of the nest builders, you will take great pleasure in watching them. Of amphibians the cute little newt is the most interesting of the family. The frog tadpoles are easy to procure and are also interesting. Snails are useful as scavengers. The *Physæ* is the best, and under favorable conditions will propagate rapidly. For crustaceans I would use the so-called fresh water shrimp or *Gammarus.*

Always use caution in stocking your aquarium with animal life; *never crowd it,* but use plants plentifully; they, as stated before, supply oxygen. If the weather should be cloudy for several successive days, you can aërate the aquarium two or three times each day, by dipping up some of the water, raising the dipper several

FRESH WATER BALANCED AQUARIUM.

inches above the surface, then pour it back, not so rapidly as to disturb the plants too much; the stream passing through the air carries oxygen with it into the aquarium. If the sun is allowed to shine on the aquarium any length of time, too much confervæ will form on the glass. The aquarium will need a thorough cleaning probably once a year, possibly oftener. The best method is to remove the animal life with a small net, then the water can be taken out by using a siphon; a piece of one-half inch rubber tubing about three feet long is best, then carefully remove the plants; now the gravel can be thoroughly washed, also the inside of the aquarium; then replace the gravel, plants, water and animal life. To clean the glass on the inside without removing the stock, use a small pad, made of a piece of soft wood covered with woolen cloth. Be sure every day to remove all dead matter, such as food not eaten by the animal life, also any dead parts of the plants.

A Salt Water Balanced Aquarium.

The principle of a salt water balanced aquarium is practically the same as for one of fresh water. It is well to procure the water at or near high tide if it is taken in a bay near the shore, or a river situated like the Harlem or East rivers. The water at such a time will have greater density and less foreign matter. I always use coarser gravel than for a fresh water aquarium; beach gravel is clean and smooth. You will require some pieces of rock for the sea anemones, as they will attach themselves to the smooth places. About the only marine plant that is always reliable for aëration is "sea lettuce," *ulva latissima*, which grows in sheets, and is found in tide pools and near shore in shallow water; instead of placing this plant on the bottom of the aquarium, use pieces of cork and float a portion of each piece or sheet on the surface of the water, allowing the remainder of the piece or sheet to hang down near the bottom towards the rear side; this will give a clear view of the animal life, and make a beautiful background. A very pretty and bright colored plant which is often used for its color and beauty is *Solieria chordalis;* it also aids aëration. For animal life first of all is the sea anemone, or "flowers of the sea," of which we have several species that are found in great numbers in the immediate vicinity of New York city; living coral can be procured in Long Island sound and on the New Jersey coast. Of snails the *Nassa*, as it is called, is the best; the common shrimp, *Crangon vulgaris*, is the best of the crustaceans. For fishes the cunning little *Lebia* is the prettiest; the two-spined stickleback is the best of all the family, and is a nest builder. The sea anemones and coral must be fed by placing pieces of food (clams and oysters are best) cut to a size to suit the animals, on the small end of a

slender rod and put in contact with the tentacles, for neither can collect their food in still water. It is necessary to remove all dead matter every day as previously stated. A little sunlight for a salt water aquarium is not injurious; but it must not be used too often, and only for a short time. With proper care the "balance" can be maintained for years.

DRYING THE NETS.

Report of the Superintendent of Forests.

To the Fisheries, Game and Forest Commission:

GENTLEMEN: I have the honor to submit for your consideration my annual report showing in detail the timber product of the Adirondack forests for the year 1899; also, in accordance with the requirements of the law, a report showing the number of forest fires, extent of burned areas, amount of damages, and other information pertaining thereto.

The total consumption of the sawmills and pulpmills in 1899 — not including pulpwood brought from Canada — was:

Sawlogs, - - -	252,178,624 feet
Pulpwood, - -	195,568,623 "
Total, - - -	447,747,247 feet

As compared with the previous year this is a falling off in the forest product of nearly one hundred million feet, or eighteen per cent. There was no decrease in the quantity of pine and hemlock; and the hardwood output shows an increase of nearly seven million feet. The decrease is found in the spruce production, both in sawed lumber and pulpwood.

The smaller amount of pulpwood cut in 1899 may be due to the large importation of Canadian stock, many of the pulpmill companies preferring to hold their Adirondack timber lands as a reserve for future supply. But the reason for the decrease in the amount of sawed lumber does not appear, unless it is due to the

rapidly diminishing supply. Within the last eight years the spruce has been removed from over 720,000 acres; and the cutting continues at the rate of over 80,000 acres per year.

The production for 1899, as classified by species, is as follows:

	FEET, B. M.
Spruce — sawmills,	148,203,491
" — pulpmills,	195,568,623
Hemlock,	46,545,772
Pine,	33,132,807
Hardwoods,	24,296,554
	447,747,247

The output of sawed lumber by districts, not including pulpwood, is:

Glens Falls District — Upper Hudson,	52,683,436
Clinton, Essex and Franklin Counties,	61,685,633
St. Lawrence County,	63,230,558
Jefferson, Lewis and Oneida Counties,	36,940,997
Herkimer and Fulton Counties,	37,638,000
	252,178,624

The latter figures refer to the localities in which the sawmills are situated rather than the districts from which the logs were taken. The mills at Glens Falls, and, also, in St. Lawrence county, get a large part of their stock from Hamilton county; and the mills in Lewis county are stocked largely from timber lands in Herkimer.

The Glens Falls district, in which the mills are supplied with logs that come down the upper Hudson, Schroon and Sacandaga rivers, shows a remarkable decrease in production, which tells plainly of the disappearance of the merchantable timber on the Hudson watershed. This is apparent on referring to the statistics showing the amount of logs received each year at the Glens Falls boom. The figures as taken from the books of the Boom Company are:

YEARS	MARKET LOGS	EQUIVALENT IN FEET, B. M.
1851,	132,500	26,500,000
1852,	345,400	69,080,000
1853,	303,000	60,600,000
1854,	297,000	59,400,000
1855,	302,500	60,500,000
1856,	292,500	58,500,000
1857,	298,000	59,600,000

J. Y. McClintock, photo.

"PORK AND BEANS."—STATE FORESTERS' CAMP.

(NEAR AMPERSAND POND, FRANKLIN CO., N. Y.)

YEARS	MARKET LOGS	EQUIVALENT IN FEET, B. M.
1858,	332,000	66,400,000
1859,	400,000	80,000,000
1860,	353,000	70,600,000
1861,	300,000	60,000,000
1862,	300,000	60,000,000
1863,	310,000	62,000,000
1864,	279,000	55,800,000
1865,	292,000	58,400,000
1866,	507,000	101,400,000
1867,	832,000	166,400,000
1868,	600,000	120,000,000
1869,	543,000	108,600,000
1870,	687,000	137,400,000
1871,	551,000	110,200,000
1872,	1,069,000	213,800,000
1873,	824,000	164,800,000
1874,	446,000	89,200,000
1875,	563,000	112,600,000
1876,	575,500	115,100,000
1877,	674,000	134,800,000
1878,	599,000	119,800,000
1879,	732,000	146,400,000
1880,	683,000	136,600,000
1881,	770,000	154,000,000
1882,	584,000	116,800,000
1883,	822,000	164,400,000
1884,	714,429	142,885,800
1885,	752,964	150,592,800
1886,	564,472	112,894,400
1887,	616,045	123,209,000
1888,	610,880	122,176,000
1889,	611,084	122,216,800
1890,	555,941	111,188,200
1891,	604,751	120,950,200
1892,	740,339	148,067,800
1893,	539,198	107,839,600
1894,	382,864	76,572,800
1895,	360,590	72,118,000
1896,	387,144	77,428,800
1897,	315,928	63,185,600
1898,	340,101	68,020,200
1899,	271,709	54,341,800
1900,	282,771	56,554,200

The apparent irregularity in the increase or decrease as shown in certain years is due in some instances to dry seasons which prevented the year's stock of logs from reaching the Glens Falls boom, part of the drives having been "hung up." For this reason the figures for some years are smaller than they otherwise would be, with a corresponding increase the next season.

The output of hardwood lumber has increased from 5,835,844 ft. in 1890, to 24,296,554 ft. in 1899. There will be a still greater increase in the hardwood cutting owing to the erection this year of a large cooperage plant and also a factory for making "wood acid," as it is called. The owners of these factories have purchased large tracts of Adirondack timber land in the vicinity of Tupper lake, and other tracts near St. Regis Falls, from which they intend in the course of their business to remove all the trees, both evergreens and hardwoods, large and small. Other firms engaged in this industry will be sure to follow. This kind of cutting results in stump fields; or, if fire breaks out in the dry brush heaps, in complete denudation and ruin. While the establishment of new industries should always be welcomed, it is a matter of regret that the timber cutting done by these companies cannot be regulated so that their supply of raw material may be obtained without entirely destroying its source.

The decrease in the consumption of pulp timber is due, as already stated, to large shipments from the Canadian forests. The production of the pulpmills in New York is greater than ever, our State still leading all others in this vast industry.

Of the 1,087 paper and pulpmills in the United States, New York has 267 as against the next highest number, 123, in Massachusetts. Then come Pennsylvania with 97, Wisconsin with 86, Ohio with 64, Maine with 61, Connecticut with 59, and Michigan with 46.

If the pulpmills only, chemical and mechanical, are considered by themselves, we find that the States rank in the following order: New York, 95; Wisconsin, 33; Maine, 31; Pennsylvania, 16; Vermont, New Hampshire, and Michigan, each 11; and Indiana, 10. In all, there are 268 pulpmills in the United States, and 40 in the Canadian provinces. Of the latter Quebec has 18 and Ontario 11; the other provinces have, in all, 11.

But the number of pulpmills in each State does not always indicate the comparative production. The combined daily capacity of the pulpmills in each State, expressed in tons of dry pulp is: New York, 1,893; Maine, 1,357; Wisconsin, 883; New Hampshire, 463; Pennsylvania, 414; Vermont, 368; and Michigan, 189.

Of the 1,893 tons, daily capacity of the mills in New York, 1,070 represent chemical fibre and 823 ground pulp.

F. A. VAN SANT, PHOTO.

AN ADIRONDACK STREAM.

The investment in plant of the pulp and paper mills in New York is estimated at $36,000,000, and their annual expenditure for wages at over $4,000,000. If to this be added the large investment in the sawmill and lumber business, together with the amount paid there, also, for wages, some idea may be obtained of the importance of our forest product and its relation to the industrial interests of our State.

In the tables showing the number of cords of wood consumed by the pulpmills, the figures in some instances do not indicate the capacity of the mills, as a part of the stock is obtained outside the State, and, for a like reason, some large pulpmills do not appear in the list at all.

The pulpmill at Palmer's Falls, Warren county, owned by the International Paper Co., is the largest in the United States or Canada, a fact which is not indicated by the amount of pulpwood obtained from the Adirondack forests.

The Niagara Woodpulp Co., at Niagara Falls, uses Canadian wood only, and the International Paper Company's mill, at the same place, gets its stock from Michigan and Canada. The Kane's Falls Pulp Co., at Fort Ann, N. Y., obtains its entire stock of pulpwood from Vermont. The Bayless Pulp and Paper Co., Binghamton, N. Y., and the Gilbert & Bell mill at Waterford, N. Y., are stocked wholly from forests outside of our State.

The production of the Adirondack forests for the year 1899, as shown by the following tables, is believed to be correct, the figures for each item having been furnished by the respective manufacturers as taken from their office books. The frequency with which the returns were made in round numbers is due to the fact that the contracts for the year's stock of logs were made that way.

GREAT FOREST OF NORTHERN NEW YORK.

LOCATION OF MILLS	NAME OF MANUFACTURER	SPRUCE
Altona,	Allen & Cunningham,	90,000
Altona,	Joseph Lagoy, Jr.,	90,000
Altona,	Fred. E. Purdy,	300,000
Ausable Forks,	J. & J. Rogers Co.,	-
Bellmont Center,	Everett Brothers,	215,000
Benson Mines,	Post & Henderson,*	1,841,683
Benson Mines,	J. L. Johnson,	25,000
Benson Mines,	Remington Paper Co.,	-
Bleecker,	John M. Peters' Sons,	225,000
Bleecker,	John M. Peters, Jr.,	250,000
Bleecker,	Robert E. Bowler,	50,000
Bleecker,	George Schamberger,	52,000
Bloomingdale,	E. M. White,	287,000
Blue Mountain Lake,	Tyler M. Merwin,	100,000
Blue Ridge,	Henry O'Neil,	60,000
Bolton Landing,	Ward & Roberts,	20,000
Brantingham,	Calvin D. Beals,	†11,536
Broadalbin,	Denton Smith,	-
Canton,	Canton Lumber Company,	9,500,000
Canton,	James Spears,‡	5,000,000
Carthage,	Carthage Lumber Company,	1,542,502
Carthage,	Balcom & Spicer,	-
Castorland,	Beaver River Lumber Co.,	10,000,000
Champlain,	R. McCrea,	50,000
Chase's Lake,	A. Crawford,	-
Clinton Mills,	Ladd & Smallman,	115,000
Conklingville,	A. A. Sumner,	-
Corinth,	C. E. Getman,	10,000
Corinth,	S. P. Williams,	5,000

* Includes cut of mill at Jayville.

† Includes 8,000 feet of tamarack.

‡ Includes cut of mill at Buck's Bridge.

LUMBER MANUFACTURED IN YEAR 1899.

HEMLOCK	PINE	HARDWOOD	TOTAL
5,000	- - -	60,000	155,000
220,000	- -	50,000	360,000
300,000	- - -	- - -	600,000
- - -	244,165	- -	244,165
20,000	- - -	- - -	235,000
1,000,551	311,094	54,216	3,207,544
65,000	10,000	650,000	750,000
- - -	- -	200,000	200,000
180,000	- - -	200,000	605,000
100,000	- -	75,000	425,000
60,000	5,000	7,000	122,000
- - -	- -	100,000	152,000
130,000	25,000	25,000	467,000
20,000	- -	2,000	122,000
75,000	2,000	25,000	162,000
40,000	200,000	50,000	310,000
73,828	45,477	17,769	148,610
100,000	50,000	- - -	150,000
700,000	50,000	- -	10,250,000
4,000,000	1,000,000	- - -	10,000,000
917,529	634,634	- -	3,094,665
- - -	- - -	100,000	100,000
6,000,000	2,000,000	- -	18,000,000
100,000	400,000	100,000	650,000
150,000	- - -	- - -	150,000
68,000	- -	50,000	233,000
- - -	- - -	1,000,000	1,000,000
90,000	100,000	40,000	240,000
70,000	75,000	- - -	150,000

GREAT FOREST OF NORTHERN NEW YORK.

LOCATION OF MILLS	NAME OF MANUFACTURER	SPRUCE
Cold Brook,	D. F. Strobel,*	1,500,000
Cold Brook,	Thomas T. Rhodes,	20,000
Cranberry Creek,	L. G. Gifford,	40,000
Crary's Mills,	Oscar Runions,	50,000
Day,	Van R. Rhodes,	30,000
Degrasse,	Chester Van Ornum,	100,000
Derrick,	C. H. Turner,	3,069,000
Duane,	Chas. Selkirk,	450,000
Dickinson Center,	B. L. Orcutt & Sons,	350,000
Edinburgh,	Sherman Tennant,	400,000
Ellenburgh,	F. W. Sherlock,	
Ellenburgh,	John L. Carter,	100,000
Ellenburgh Center,	John Houghran,	306,772
Elizabethtown,	Livingston Woodruff,	75,000
Emmonsburgh,	Brownell Brothers,	75,000
Euba Mills,	Orlando Beede & Sons,	200,000
Fine,	Cardiff Brothers,	
Forestport,	Forestport Lumber Co.,	3,527,866
Forestport,	Denton & Waterbury,	2,500,000
Forestport,	James Gallagher, Jr.,	1,250,000
Forestport,	Edward Curran,	500,000
Forestport,	Syphert & Harrig,	500,000
Forestport,	William Ano,	250,000
Fowler,	J. O. Davis,	10,000
Fulton Chain,	Pullman Lumber Co.,	500,000
Garnet,	John Grogan, Jr.,	50,000
Glens Falls,	Finch, Pruyn & Co.,	17,000,000
Glens Falls,	Morgan Lumber Co.,	7,135,912
Glens Falls,	Geo. H. Freeman,	1,000,000
Gloversville,	R. E. Holmes,	
Gloversville,	W. DeGoyler,	200,000

* Includes cut of mills at California and Minnehaha, N. Y.

LUMBER MANUFACTURED IN YEAR 1899.

HEMLOCK	PINE	HARDWOOD	TOTAL
50,000	- - -	2,250,000	3,800,000
98,000	- -	325,000	443,000
100,000	90,000	40,000	270,000
100,000	50,000	200,000	400,000
450,000	300,000	100,000	880,000
600,000	100,000	- - -	800,000
- - -	8,800,000	- -	11,869,000
50,000	- - -	- - -	500,000
150,000	- -	550,000	1,050,000
500,000	30,000	400,000	1,330,000
50,000	- - -	75,000	125,000
200,000	- - -	*75,000	375,000
10,000	- - -	20,000	336,772
40,000	75,000	5,000	195,000
10,000	1,000	25,000	111,000
200,000	100,000	25,000	525,000
175,000	20,000	200,000	395,000
- - -	- - -	- - -	3,527,866
- - -	- -	- -	2,500,000
- - -	- - -	100,000	1,350,000
100,000	- -	400,000	1,000,000
- - -	- - -	200,000	700,000
- -	- -	300,000	550,000
100,000	10,000	20,000	140,000
- - -	200,000	- - -	700,000
100,000	30,000	- -	180,000
1,500,000	300,000	- - -	18,800,000
1,745,689	2,174,117	89,698	11,145,416
70,000	200,000	3,414	1,273,414
300,000	- - -	- - -	300,000
75,000	5,000	10,000	290,000

* Basswood.

GREAT FOREST OF NORTHERN NEW YORK.

LOCATION OF MILLS	NAME OF MANUFACTURER	SPRUCE
Gloversville,	A. T. Peck,	100,000
Grant,	F. W. Carruthers,	300,000
Gray,	G. Bennett,	450,000
Gray,	Douglas L. Comstock,	200,000
Gray,	C. B. Gray,	50,000
Greenfield,	R. E. Cronkhite,	
Greig,	Ira Gallup,	10,000
Gurn Spring,	F. S. Van Wagner,	
Harrisville,	C. R. Remington & Son Co.,	
Harrisville,	William Humes,	125,000
Harrisville,	John Greer,	15,000
Herkimer,	C. R. Snell,	
Hermon,	R. J. Fairbanks,	400,000
Hope,	J. F. Brownell,	30,000
Hadley,	W. Stone & Son,	10,000
Inlet,	Peter J. Rohr,	500,000
Inman,	M. E. Walker,	2,000,000
Jay,	Nye Brothers,	425,000
Keene,	E. P. Bell,	100,000
Keene Center,	H. C. Nye,	200,000
Keene Valley,	F. S. Beede,	400,000
Lake Pleasant,	M. B. Hosley,	100,000
Lake Pleasant,	Asa Aird,	100,000
Lewis Center,	J. P. Downs,	30,000
Long Lake,	R. Shaw & Son,	360,000
Long Lake,	W. C. Robonson & Bro.,	120,000
Long Lake,	A. W. Shaw,	125,000
Long Lake,	William Wilson,	174,489

LUMBER MANUFACTURED IN YEAR 1899—CONTINUED.

HEMLOCK	PINE	HARDWOOD	TOTAL
50,000	25,000	4,000	179,000
100,000	- - -	* 100,000	500,000
60,000	- -	90,000	600,000
10,000	- - -	75,000	285,000
- - -	- -	100,000	150,000
30,000	60,000	10,000	100,000
40,000	28,000	120,000	198,000
100,000	150,000	50,000	300,000
†1,935,541	70,161	32,154	2,037,856
100,000	- - -	‡ 530,000	755,000
100,000	20,000	40,000	175,000
250,000	- - -	250,000	500,000
500,000	- -	100,000	1,000,000
50,000	2,000	20,000	102,000
300,000	5,000	500,000	815,000
200,000	75,000	- - -	775,000
250,000	150,000	200,000	2,600,000
- - -	175,000	10,000	610,000
- -	- - -	- - -	100,000
10,000	10,000	5,000	225,000
200,000	- - -	50,000	650,000
75,000	5,000	10,000	190,000
50,000	20,000	15,000	185,000
60,000	§ 300,000	40,000	430,000
250,000	30,000	13,000	653,000
65,000	27,000	4,000	216,000
75,000	10,000	7,000	217,000
50,135	5,917	3,681	234,222

* Includes 50,000 feet of basswood.

† Includes some spruce.

‡ Includes 100,000 feet of basswood.

§ Includes some basswood.

GREAT FOREST OF NORTHERN NEW YORK.

LOCATION OF MILLS	NAME OF MANUFACTURER	SPRUCE
Lyonsdale,	C. L. J. Ager,	150,000
Luzerne,	J. C. Shaver,	30,000
Luzerne,	Fred C. Hall,	150,000
Malone,	M. N. Dawson,	400,000
Malone,	Ladd & Smallman,	88,800
Mayfield,	Neil Haines,	25,000
McKeever,	Moose River Lumber Co.,	12,055,000
Middle Grove,	Chas. H. Killmer,	25,000
Middle Sprite,	George Shull,	125,000
Middle Sprite,	John C. Shulenburgh,	75,000
Middle Sprite,	George Van Allen,	75,000
Mooers Forks,	H. H. Howard,	- - -
Morrisonville,	F. M. Purdy,	3,000,000
Mountain View,	E. R. Bryant,	1,200,000
Natural Bridge,	J. W. Brace,	10,000
Natural Bridge,	Calvin V. Graves,	20,000
Natural Bridge,	Streeter & Makepeace,	- - -
Natural Dam,	Aldrich, Dean & Aldrich,	5,500,000
Naumburgh,	C. S. Squire,	25,000
Newton Falls,	Newton Falls Paper Co.,	248,936
Newton Falls,	North Woods Lumber Co.,	- - -
Newcomb,	John Anderson, Jr.,	300,000
Newman,	Edward Brewster,	90,000
North Broadalbin,	James B. Spencer,	10,000
North Creek,	John Barton,	15,000
North Elba,	B. R. Brewster,	700,000
North Hudson,	William Sturtevant,	15,000
Northville,	John A. Willard,	180,000
Norwood,	Norwood Manufacturing Co.,	5,065,804
Onchioto,	Baker Brothers Lumber Co.,	500,000

LUMBER MANUFACTURED IN YEAR 1899 — CONTINUED.

HEMLOCK	PINE	HARDWOOD	TOTAL
300,000	69,000	12,000	531,000
275,000	50,000	80,000	435,000
300,000	50,000	75,000	575,000
80,000	- - -	- - -	480,000
59,200	- -	- -	148,000
75,000	40,000	10,000	150,000
965,000	562,000	11,000	13,593,000
25,000	150,000	- -	200,000
- -	- - -	10,000	135,000
75,000	- -	100,000	250,000
50,000	- - -	25,000	150,000
43,000	68,000	21,000	132,000
500,000	200,000	150,000	3,850,000
400,000	80,000	413,000	2,093,000
75,000	60,000	100,000	245,000
40,000	15,000	50,000	125,000
600,000	100,000	300,000	1,000,000
4,500,000	1,200,000	- - -	11,200,000
190,000	30,000	*83,000	348,000
867,289	85,463	722,505	1,924,193
- - -	- - -	300,000	300,000
100,000	10,000	15,000	425,000
30,000	10,000	5,000	135,000
50,000	75,000	5,000	140,000
60,000	20,000	10,000	105,000
- - -	10,000	30,000	740,000
70,000	20,000	5,000	110,000
200,000	300,000	†320,000	1,000,000
12,252	1,408,717	1,462	6,488,235
- - -	- - -	- - -	500,000

* Includes 10,000 feet basswood and 23,000 feet black and white ash.

† Includes 160,000 feet basswood.

GREAT FOREST OF NORTHERN NEW YORK.

LOCATION OF MILLS	NAME OF MANUFACTURER	SPRUCE
Ohio,	William Somers,	200,000
Old Forge,	S. F. Garmon,	125,000
Oswegatchie,	Andrew Collins,	150,000
Oswegatchie,	John Irvin,	50,000
Oswegatchie,	J. R. Lafave,	
Otter Lake,	J. H. Wilcox,	200,000
Owls Head,	S. G. Boyce,	1,890,000
Parishville,	Parishville Lumber Co.,	3,000,000
Parishville,	S. L. Clark & Son,	2,000,000
Paul Smiths,	Paul Smith & Son,	400,000
Pine Lake,	Frank A. Hill,	200,000
Pine Lake,	William H. Baker,	500,000
Pine Lake,	Henry T. Bona,	100,000
Pitcairn,	N. H. Carter,	5,000
Potsdam,	The A. Sherman Lumber Co.,	4,463,877
Potsdam,	Milton H. Brown,	800,000
Port Leyden,	G. R. Seymour,	
Raquette Lake,	*J. G. Thompson,	600,000
Reynoldston,	Reynolds Bros. & Co.,	500,000
Rockwood,	Everett Young,	300,000
Rockwood,	Levi Stahl & Son,	150,000
Salisbury,	James Fuller,	165,000
Salisbury Center,	J. F. McDougal,	75,000
Sandy Hill,	Kenyon Lumber Co.,	4,280,000
Saranac Lake,	Stephen Merchant,	400,000
Saranac Inn,	Upper Saranac Association,	1,250,000
St. Regis Falls,	Watson Page Lumber Co.,	40,000
Saratoga,	Edward H. Hoyt,	
Saratoga,	Edward Dunham,	
Severance,	W. L. Bentley,	25,000

* Mill at Marion River Carry.

LUMBER MANUFACTURED IN YEAR 1899 — CONTINUED.

HEMLOCK	PINE	HARDWOOD	TOTAL
- -	- -	- -	200,000
75,000	50,000	10,000	260,000
100,000	25,000	400,000	675,000
100,000	- - -	400,000	550,000
- - -	50,000	400,000	450,000
10,000	- - -	1,000,000	1,210,000
20,000	25,000	1,560,000	3,495,000
1,000,000	250,000	- - -	4,250,000
500,000	50,000	- -	2,550,000
- - -	100,000	- - -	500,000
100,000	20,000	- -	320,000
125,000	10,000	20,000	655,000
40,000	- - -	- - -	140,000
25,000	15,000	225,000	270,000
23,217	53,492	- - -	4,540,586
100,000	15,000	- -	915,000
75,000	- - -	30,000	105,000
100,000	100,000	50,000	850,000
200,000	- - -	125,000	825,000
200,000	75,000	50,000	625,000
300,000	100,000	50,000	600,000
- - -	- - -	25,000	190,000
50,000	50,000	50,000	225,000
1,890,000	2,460,000	20,000	8,650,000
50,000	25,000	30,000	505,000
500,000	150,000	- - -	1,900,000
- -	20,000	2,593,629	2,653,629
125,000	310,000	40,000	475,000
75,000	175,000	- - -	250,000
100,000	50,000	40,000	215,000

GREAT FOREST OF NORTHERN NEW YORK.

LOCATION OF MILLS	NAME OF MANUFACTURER	SPRUCE
Simpson,	Andrew Negas,	10,000
Skerry,	G. B. Walker,	425,000
Skerry,	N. C. Bowen,	200,000
South Schroon,	F. N. Tyrell,	100,000
Stony Creek,	Lee L. Hall,	- - -
Stony Creek,	Chas. Smith,	25,000
Stony Creek,	A. D. Scribner,	100,000
Star Lake,	Frank J. Redway,	100,000
Stratford,	J. C. Livingston & Co.,	2,350,000
Stratford,	Wheeler Knapp,	475,000
Stratford,	C. P. Goodwin,	150,000
Stratford,	T. D. McClure,	*300,000
Stratford,	F. J. Helterline,	350,000
Ticonderoga,	W. J. Smith,	10,000
Ticonderoga,	R. P. Mead,	40,000
Ticonderoga,	S. B. Moore,	200,000
Tupper Lake,	A. Sherman Lumber Co.,	11,685,082
Vail Mills,	William Vail & Sons,	10,000
Wadhams Mills,	D. F. Payne,	250,000
Wadhams Mills,	O. A. Phinney,	200,000
Warrensburgh,	A. C. Emerson & Co.,	300,000
West Stockholm,	Geo. N. Gibson & Son,	400,000
West Milton,	William W. Streever,	- - -
Whippleville,	F. H. Lyman,	100,000
Wilmurt,	Richards Brothers,	122,232
Various places,	Small mills,	1,000,000
	Total,	148,203,491

*Includes some hemlock.

LUMBER MANUFACTURED IN YEAR 1899 — CONCLUDED.

HEMLOCK	PINE	HARDWOOD	TOTAL
75,000	- - -	*100,000	185,000
113,000	50,000	190,000	778,000
150,000	- - -	25,000	375,000
100,000	120,000	10,000	330,000
50,000	- - -	800,000	850,000
150,000	2,000	110,000	287,000
50,000	10,000	200,000	360,000
50,000	- - -	60,000	210,000
- - -	- -	400,000	†2,750,000
200,000	50,000	300,000	1,025,000
50,000	- - -	60,000	260,000
- - -	- -	250,000	550,000
50,000	- - -	30,000	430,000
200,000	700,000	100,000	1,010,000
200,000	500,000	75,000	815,000
100,000	- - -	100,000	500,000
- -	2,008,570	5,415	13,699,067
80,000	500,000	- - -	590,000
70,000	500,000	30,000	850,000
250,000	300,000	25,000	775,000
1,330,000	400,000	- - -	2,030,000
280,000	100,000	50,000	830,000
75,000	275,000	150,000	500,000
100,000	- -	200,000	400,000
128,541	- - -	55,611	306,384
600,000	- -	400,000	2,000,000
46,545,772	33,132,807	24,296,554	252,178,624

* Includes 50,000 feet of basswood.

† Includes lumber cut at Oregon and Fulton Chain.

GREAT FOREST OF NORTHERN NEW YORK.

CONSUMPTION OF PULP WOOD FOR YEAR 1899.

LOCATION OF MILL	NAME OF MANUFACTURER	CORDS
Ausable Forks,	J. & J. Rogers Co.,	33,459
Ausable Chasm,	Alice Falls Co.,	5,100
Ausable Chasm,	L. B. Chisholm,	313
Beaver Falls,	The J. P. Lewis Co.,	1,272
Beaver Falls,	Lewis, Slocum & LeFevre,	1,800
Black River,	*Jefferson Paper Co.,	7,000
Black River,	H. Remington & Son P. & P. Co.,	5,000
Black River,	Black River Wood Pulp Co.,	700
Black River,	Empire Wood Pulp Co.,	219
Brownville,	Brownville Paper Co.,	1,655
Cadyville,	International Paper Co.,	30,000
Carthage,	Carthage Sulphite Pulp Co.,	13,500
Carthage,	West End Pulp and Casket Co.,	1,875
Carthage,	A. E. Maxwell,	1,000
Chateaugay,	Chateaugay Pulp Co.,	2,500
Chateaugay,	High Falls Pulp Co.,	3,000
Colton,	Raquette River Pulp Co.,	4,900
Dexter,	Dexter Sulphite P. & P. Co.,	10,496
Dexter,	St. Lawrence Mills,	1,018
Dexter,	Hunter & Osborn,	200
Dexter,	Frontenac Paper Co.,	402
Edwards,	South Edwards Pulp Co.,	1,590
Emeryville,	Gouverneur Wood Pulp Co.,	4,012
Fort Edward,	International Paper Co.,	6,000
Fort Miller,	Fort Miller Pulp & Paper Co.,	640
Felts Mills,	Taggarts Paper Co.,	4,673
Fullerville,	Keller Brothers,	1,000
Fulton,	Fulton Paper Co.,	4,425
Fulton,	Oswego Falls Pulp and Paper Co.,	4,500

* Mills at Black River and Herring, N. Y.

F. A. VAN SANT, PHOTO.

WHITE FACE MOUNTAIN RANGE, ESSEX CO., N. Y.

(THE PIERS IN THE RIVER ARE FOR HOLDING BOOMS TO KEEP LOGS IN THE CURRENT.)

GREAT FOREST OF NORTHERN NEW YORK.

CONSUMPTION OF PULP WOOD FOR YEAR 1899.

(Continued.)

LOCATION OF MILL	NAME OF MANUFACTURER	CORDS
Glens Falls,	International Paper Co.,	12,000
Great Bend,	Taggarts Paper Co.,	1,797
Greenwich,	Washington Pulp & Paper Mills,	600
Greenwich,	Blandy Paper Co.,	810
Greig,	Edward Carter,	450
Hadley,	Sacandaga Pulp Mills,	1,000
Hinckley,	Hinckley Fiber Co.,	18,975
Lyons Falls,	Gould Paper Co.,	8,199
Lyons Falls,	International Paper Co.,	5,500
Lyons Falls,	Moyer & Pratt,	1,913
Lockport,	Lockport Pulp Co.,	4,000
Lockport,	Traders Paper Co.,	2,400
Lockport,	United Undurated Fiber Co.,	993
Middle Falls,	Bennington Falls Pulp Co.,	800
Mcchanicville,	The Duncan Company,	10,752
Newton Falls,	Newton Falls Paper Co.,	9,000
Norwood,	O. E. Martin,	1,200
Oswegatchie,	Standard Pulp Co.,	2,252
Palmer,	International Paper Co.,	3,000
Piercefield,	International Paper Co.,	13,000
Plattsburgh,	Freydenburgh Falls Pulp Co.,	7,500
Plattsburgh,	Treadwell Mills P. & P. Co.,	6,000
Plattsburgh,	James H. Allen,	2,413
Port Leyden,	Johnston & Gibbie,	1,600
Potsdam,	Raquette River Paper Co.,	8,000
Rochester,	Genesee Paper Co.,	4,500
Sandy Hill,	*Union Bag and Paper Co.,	3,333
Schuylerville,	American Wood Board Co.,	1,825

* Mills at Sandy Hill and Ballston Spa.

GREAT FOREST OF NORTHERN NEW YORK.

CONSUMPTION OF PULP WOOD FOR YEAR 1899.

(Concluded.)

LOCATION OF MILL	NAME OF MANUFACTURER	CORDS
Ticonderoga,	*Ticonderoga Pulp & Paper Co.,	11,047
Ticonderoga,	International Paper Co.,	11,000
Ticonderoga,	E. Richards & Son,	2,000
Warrensburgh,	Schroon River Pulp Co.,	2,667
Watertown,	†International Paper Co.,	32,500
Watertown,	Knowlton Brothers,	608
Willsboro,	New York & Pennsylvania Co.,	10,434
	Total,	356,227

* Poplar and basswood. Used wood from Canada also.

† Includes the work of three mills.

F. A. VAN SANT, PHOTO.

THE NARROWS IN WILMINGTON NOTCH.

STATE FOREST PRESERVE.

GREAT FOREST OF NORTHERN NEW YORK.

MANUFACTURE OF SHINGLES AND LATH FOR THE YEAR 1899.

LOCATION OF MILL	NAME OF MANUFACTURER	SHINGLES	LATH
Altona,	Joseph Lagoy, Jr.,	400,000	-
Altona,	Fred E. Purdy,	500,000	500,000
Ausable Forks,	J. & J. Rogers Co.,	96.250	-
Bloomingdale,	E. M. White,	110,000	-
Blue Mt. Lake,	*J. G. Thompson,	84,000	51,000
Canton,	Canton Lumber Co.,	-	2,000,000
Canton,	James Spears,	50,000	-
Carthage,	Carthage Lumber Co.,	-	591,000
Chase's Lake,	A. Crawford,	350,000	150,000
Champlain,	R. McCrea,	-	200,000
Clinton Mills,	Ladd & Smallman,	510,000	205,000
Day,	Van R. Rhodes,	600,000	100,000
De Grasse,	Chester Van Ornum,	400,000	100,000
Dickinson Center,	B. L. Orcutt & Sons,	1,500,000	-
Duane,	Chas. Selkirk,	200,000	-
Edinburgh,	Sherman Tennant,	-	200,000
Ellenburgh,	John L. Carter,	100,000	-
Ellenburgh,	John Haughran,	282,000	-
Elizabethtown,	Livingston Woodruff,	325,000	100,000
Euba Wells,	Orlando Beede & Son,	400,000	-
Forestport,	Forestport Lumber Co.,	-	2,449,200
Forestport,	Denton & Waterbury,	275,000	3,200,000
Forestport,	Syphert & Harrig,	-	2,000,000
Fowler,	J. O. Davis,	150,000	-
Glens Falls,	Finch, Pruyn & Co.,	500,000	7,000,000
Glens Falls,	Morgan Lumber Co.,	-	1,500,000
Glens Falls,	Geo. H. Freeman,	-	954,100
Gloversville,	A. T. Peck,	-	200,000
Gloversville,	R. E. Holmes,	-	100,000
Grant,	F. W. Carruthers,	250,000	100,000

* Mill at Marion River Carry.

GREAT FOREST OF NORTHERN NEW YORK.

MANUFACTURE OF SHINGLES AND LATH FOR THE YEAR 1899.

(Continued.)

LOCATION OF MILL	NAME OF MANUFACTURER	SHINGLES	LATH
Harrisville,	C. R. Remington & Son Co.,	-	186,500
Harrisville,	William Humes.	500,000	-
Harrisville,	John Greer,	250,000	-
Hermon,	R. J. Fairbanks,	500,000	-
Inlet,	Peter J. Rohr,	275,000	-
Inman,	M. E. Walker,	2,465,000	1,000,000
Jayville,	Post & Henderson,	391,750	343,990
Keene Valley,	F. S. Beede,	375,000	350,000
Lake Pleasant,	M. B. Hosley,	-	80,000
Lewis Center,	J. P. Downs,	265,000	10,000
Long Lake,	William Wilson,	172,000	-
Long Lake,	A. W. Shaw,	-	200,000
Long Lake,	O. B. Lapell,	400,000	-
Luzerne,	Fred C. Hall,	125,000	-
Luzerne,	J. C. Shaver,	50,000	-
McKeever,	Moose River Lumber Co.,	-	6,615,000
Mooers Forks,	H. H. Howard,	700,000	-
Morrisville,	F. M. Purdy,	1,500,000	400,000
Mountain View,	E. A. Bryant,	600,000	-
Natural Bridge,	J. W. Brace,	350,000	75,000
Natural Bridge,	Calvin V. Graves,	250,000	-
Natural Dam,	Aldrich, Dean & Aldrich,	1,946,000	3,353,600
North Elba,	B. R. Brewster,	800,000	50,000
North Hudson,	William Sturtevant,	125,000	50,000
Northville,	Jno. A. Willard,	-	200,000
Norwood,	Norwood Mfg. Co.,	-	2,000,000
Oswegatchie,	John Irvin,	100,000	-
Owls Head,	S. G. Boyce,	1,250,000	800,000
Parishville,	Parishville Lumber Co.,	2,000,000	
Parishville,	S. L. Clark & Son,	1,000,000	

F. A. VAN SANT, PHOTO.

WHERE THE AU SABLE SLEEPS.

GREAT FOREST OF NORTHERN NEW YORK.

MANUFACTURE OF SHINGLES AND LATH FOR THE YEAR 1899.

(Concluded.)

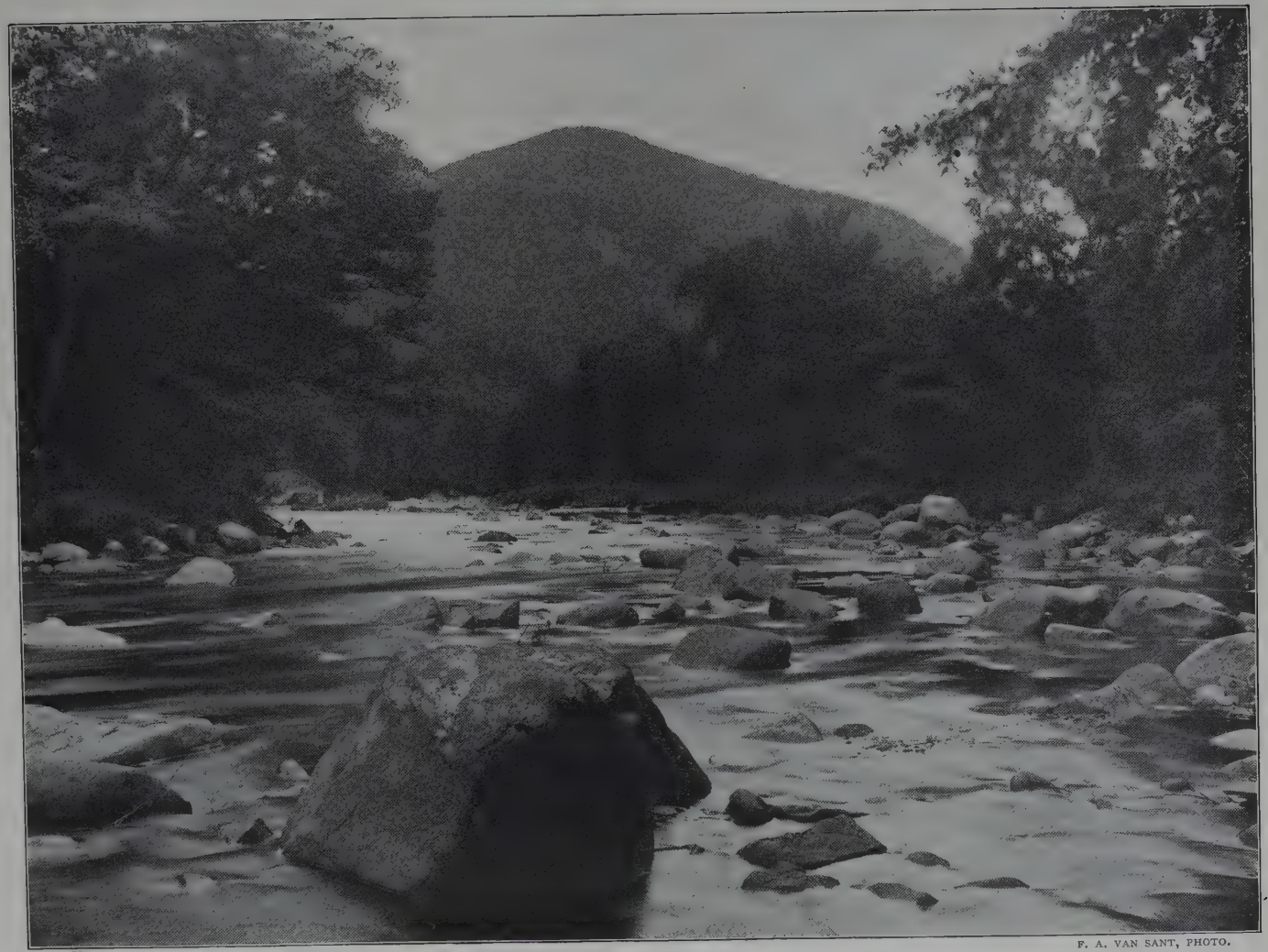
LOCATION OF MILL	NAME OF MANUFACTURER	SHINGLES	LATH
Paul Smiths,	Paul Smith & Sons,	100,000	300,000
Potsdam,	A. Sherman Lumber Co.,	3,167,000	831,200
Potsdam,	Milton H. Brown,	300,000	-
Pine Lake,	William H. Baker,	-	350,000
Pine Lake,	Frank A. Hill,	-	200,000
Pine Lake,	Henry T. Bona,	-	100,000
Reynoldston,	Reynolds Bros. & Co.,	1,000,000	1,200,000
Rockwood,	Everett Young,	30,000	400,000
Rockwood,	Levi Stahl & Son,	-	200,000
Sandy Hill,	Kenyon Lumber Co.,	-	2,180,000
Saranac Lake,	Stephen Merchant,	500,000	200,000
Saranac Inn,	Upper Saranac Asso.,	200,000	50,000
Severance,	W. L. Bentley,	500,000	20,000
Simpson,	Andrew Negas,	100,000	40,000
Skerry,	G. B. Walker,	2,500,000	-
Skerry,	N. C. Bowen,	200,000	-
South Schroon,	F. N. Tyrell,	250,000	-
Stony Creek,	Lee L. Hall,	200,000	-
Stratford,	Wheeler Knapp,	300,000	100,000
Stratford,	T. D. McClure,	-	200,000
Tupper Lake,	A. Sherman Lumber Co.,	-	5,119,900
Warrensburgh,	A. C. Emerson & Co.,	200,000	308,000
West Milton,	Wm. W. Streever,	-	75,600
West Stockholm,	Geo. N. Gibson & Son,	600,000	40,000
	Total,	33,619,000	49,329,090

PRODUCTION OF LUMBER BY DISTRICTS IN 1899.

	FEET.
Glens Falls District,	52,683,436
Clinton, Essex and Franklin Counties,	61,685,633
St. Lawrence County,	63,230,558
Jefferson, Lewis and Oneida Counties,	36,940,997
Herkimer and Fulton Counties,	37,638,000
Total,	252,178,624

SUMMARY.

Spruce,	148,203,491
Hemlock,	46,545,772
Pine,	33,132,807
Hardwood,	24,296,554
Total lumber,	252,178,624
Pulpwood 356,227 cords, equivalent B. M.,	195,568,623
Total lumber and pulpwood,	447,747,247
Shingles,	33,619,000
Lath,	49,329,090



F. A. VAN SANT, PHOTO.

A BAD PLACE FOR THE LOG DRIVERS.

YEARLY PRODUCTION OF LUMBER AND PULPWOOD FROM 1890 TO 1899.

	FEET	FEET
1890 — Lumber,	325,690,634	
Pulpwood, 94,638 cords, equivalent B. M.,	51,966,262	
		377,656,896
1891 — Lumber,	286,710,593	
Pulpwood, 126,183 cords, equivalent B. M.,	69,274,283	
		365,984,876
1892 — Lumber,	406,954,200	
Pulpwood, 147,392 cords, equivalent B. M.,	80,918,537	
		487,872,737
1893 — Lumber,	355,050,528	
Pulpwood, 167,825 cords, equivalent B. M.,	92,135,709	
		447,186,235
1894 — Lumber,	288,700,269	
Pulpwood, 204,182 cords, equivalent B. M.,	112,095,918	
		400,796,187
1895 — Lumber,	297,610,161	
Pulpwood, 276,669 cords, equivalent B. M.,	151,891,281	
		449,501,442
1896 — Lumber,	270,215,372	
Pulpwood, 291,246 cords, equivalent B. M.,	159,894,054	
		430,109,426
1897 — Lumber,	284,907,544	
Pulpwood, 302,528 cords, equivalent B. M.,	166,087,872	
		450,995,416
1898 — Lumber,	314,652,289	
Pulpwood, 418,182 cords, equivalent B. M.,	229,581,918	
		544,234,207
1899 — Lumber,	252,178,624	
Pulpwood, 356,227 cords, equivalent B. M.,	195,568,623	
		447,747,247

YEARLY PRODUCTION OF SHINGLES FROM 1894 TO 1899.

1894,	18,683,000 pieces.
1895,	18,267,000 "
1896,	16,256,000 "
1897,	35,623,750 "
1898,	27,273,000 "
1899,	33,619,000 "

YEARLY PRODUCTION OF LATH FROM 1894 TO 1899.

1894,	32,453,000 pieces.
1895,	34,295,000 "
1896,	21,050,000 "
1897,	47,661,150 "
1898,	43,933,790 "
1899,	49,329,090 "

Forest Fires.

THE year 1899 will long be remembered by the people of our North Woods as the season when the great fires occurred. The extraordinary, long-continued drought resulted in conditions that facilitated the starting of fires, which, in number and area, far exceeded any that had ever happened in all that region.

Fortunately, the trees, being in full leaf, no great damage was done to the forests, the greater part of the fires being in clearings and on waste lands that had been burned over once or twice before. Throughout the Adirondacks there are large areas devoid of timber which are covered with a low, scrubby growth or with ferns and bushes. The most of the fires occurred on lands of this class. At the same time the adjoining woods were endangered, and the progress of the flames had to be stopped in order to prevent the serious loss which would occur if a fire were to gain headway in the heavy timber.

The fires commenced in Hamilton county on August 6th, and within a few days they started up at various places in every county throughout the Adirondacks. It soon became evident that without some assistance the towns would be unable, in certain districts, to successfully meet the emergency. Hon. Charles H. Babcock, of the Fisheries, Game and Forest Commission, was in the Adirondacks at this time, where he was watching carefully the course of the fires and rendering every assistance in his power to protect the forests from the serious danger which threatened them. On conferring with the Superintendent of Forests, who was also on the ground, it became evident to the Commissioner from

the reports then made that more vigorous measures were necessary in certain localities to save the woods from destruction.

Commissioner Babcock accordingly returned to Albany, where he held a personal consultation with Governor Roosevelt and Col. William J. Morgan, the Comptroller of the State, in which he described the situation and pointed out the urgent necessity of some assistance on the part of the State. Mr. Babcock explained that in many of the towns there was an evident reluctance on the part of the officials to warn out the necessary number of men to fight fires owing to the heavy expense and consequent taxes which would be assessed upon the town. In some towns, also, where the authorities were willing to do whatever was required, there proved to be a scarcity of men. In other places men refused to go to a fire, alleging that they would not get their pay from the town until after the annual meeting of the board of supervisors, which occurs in December; and that even then they would receive no money, but, instead, an order on the tax collector, which they would have to sell at a discount. The inability of the Superintendent of Forests to organize working parties in each locality on account of these conditions was also explained by Commissioner Babcock, whereupon he was authorized by the Governor and Comptroller, in view of the emergency, to employ men with a promise that they should be paid promptly, and a fund was provided at Albany for this purpose.

Having made these necessary arrangements for an emergency fund, Commissioner Babcock returned to the woods and assumed charge of the fires on the west side, while the Superintendent of Forests went to the east side and looked after matters in Hamilton and Essex counties.

In the course of the work it became necessary where there was no firewarden on duty, or where the firewarden was unable to obtain help, to hire men and promise them prompt payment. In some places where there was no resident population, Commissioner Babcock found it necessary to hire men in some village, and move these men by railroad to where the fires were burning.

After the fires had all been extinguished, the firewardens, who had been acting under the orders of the Commissioner, were instructed to send their bills to Albany for payment, which was made from the emergency fund provided by the Governor and Comptroller. For convenience this business, so far as the payments were concerned, was transacted through the office of the Forest Preserve Board. After careful examination of the various pay-rolls, checks were made payable to the order of each man on the rolls, and mailed to the respective firewardens for distribution. These payments were as follows:

COUNTY	TOWN	FIREWARDEN	PAY-ROLL
Franklin,	Santa Clara,	Willard Boyce,	$848 25
"	"	B. E. Fernow,	700 00
"	Harriettstown,	B. E. Fernow,	335 00
"	"	Isaiah Vosburgh,	892 68
"	"	J. W. Pond,	92 98
"	Brighton,	Benjamin A. Muncil,	340 25
"	Franklin,	Ferd. W. Chase,	73 60
"	Altamont,	Evereste Le Boeuf,	1,497 55
Hamilton,	Indian Lake,	Robert B. Nichols,	2,034 55
"	"	B. F. Merwin,	1,170 25
"	Morehouse,	Fred N. Kirch,	797 25
"	Arietta,	F. W. Abrams,	518 67
"	Wells,	T. D. Brown,	323 25
"	"	C. L. Fry,	21 00
Herkimer,	Webb,	H. L. Waite,	210 00
"	Wilmurt,	J. M. Richards,	29 50
Lewis,	Croghan,	John H. Bintz,	483 87
Oneida,	Forestport,	Edward Curran,	91 50
St. Lawrence,	Hopkinton,	Emery P. Gale,	882 09
"	"	C. E. Leland,	79 50
Warren,	Johnsburgh,	William Merrill,	208 25
"	Horicon,	*Abel Crook,	302 00
Washington,	Fort Ann,	E. H. Sturtevant,	763 52
		†N. Y. C. & H. R. R.R.,	146 46
			$12,841 97

*For money advanced to men; there was no firewarden in the town at the time.

†For use of locomotive and special train to move gangs of men and tools, from place to place, where they were needed.

One-half of this amount will be repaid to the State by the towns in which these expenses were incurred, in accordance with the law providing that the cost of fighting fire shall be borne by the State and town alike. Ordinarily, the town, pursuant to the provisions of the fire law, pays the entire bill each year for expenses of this kind, after which it receives a rebate from the State for one-half of the amount thus expended. On account of the many fires last summer it became necessary, in certain towns, for the State to advance the entire amount, one-half of which will have to be collected from the towns.

The item of $146.46 paid the N. Y. C. & H. R. R. R. Co. was for a locomotive and special train which Commissioner Babcock used in moving parties of men to the fires at distant points where there was no resident population, and where men could not otherwise be obtained. This train was in use four days, part of the time both night and day.

In view of the commendable promptness with which the Governor and Comptroller provided the funds necessary to protect our forests in time of great danger, it is hoped that the Legislature will promptly make the necessary appropriation to reimburse the State treasury for the sum thus advanced.

A report of each fire was received at the office of the Commission, and from the statements thus forwarded by the various firewardens the following table was prepared :

F. A. VAN SANT, PHOTO.

"THE LOGS ARE COMING!"

HEAD OF THE DRIVE.

Report of Forest Fires
For the Year Ending December 31, 1899.

ADIRONDACK COUNTIES.

Clinton County.

TOWN	DATE	ACRES	DAMAGE	CAUSE OF FIRE
Ausable	April 28	65	$210	Locomotive
Ausable	August 18	70	145	Unknown
Black Brook	April 29	800	100	Clearing land
Black Brook	June 19	300	100	Fishermen
Black Brook	August 5	40	50	Berry pickers
Black Brook	August 8	300	200	Berry pickers
Black Brook	August 19	100	150	Hunters
Black Brook	August 20	150	50	Hunters

Essex County.

Chesterfield	September 15	35	$40	Locomotive
Elizabethtown	August 23	500	400	Campers
Jay	June 14	50	20	Smokers
Jay	August 9	150	300	Unknown
Jay	August 18	125	200	Burning building
Jay	August 18	300	400	Unknown
Lewis	August 20	100	25	Burning building
Minerva	May 9	20	- -	Incendiary
Minerva	August 6	20	-	Lightning
Minerva	August 21	150	10	Unknown
Minerva	September 7	175	15	Unknown
Minerva	September 16	150	25	Campers
Moriah	July 14	450	550	Unknown
Moriah	August 18	750	1,500	Camp fire
Moriah	August 20	150	550	Incendiary
Moriah	August 22	200	200	Lightning
Newcomb	August 15	10	35	Unknown

ESSEX COUNTY.— Continued.

TOWN	DATE	ACRES	DAMAGE	CAUSE OF FIRE
North Elba	May —	450	$100	Clearing land
North Elba	August 14	50	10	Clearing land
North Elba	August 18	15	5	Unknown
North Elba	August 19	80	10	Burning garbage
North Hudson	May 9	150	25	Unknown
North Hudson	August 13	250	75	Cigar stub
Schroon	May 10	40	- -	Unknown
Schroon	July 2	20	-	Unknown
Schroon	August 7	200	100	Lightning
Schroon	August 8	25	10	Lightning
Schroon	August 9	300	75	Lightning
Schroon	August 9	25	5	Clearing land
Schroon	August 25	1,128	400	Incendiary
Schroon	September 8	15	5	Lightning
St. Armand	September 1	125	5	Campers
St. Armand	September 1	150	20	Locomotive
St. Armand	September 20	50	15	Campers
Ticonderoga	April 29	75	75	Clearing land
Ticonderoga	August 6	550	1,050	Berry pickers
Westport	July 1	25	- -	Locomotive
Westport	August 14	75	25	Locomotive
Willsborough	June 17	12	- -	Unknown
Wilmington	April 28	80	-	Clearing land
Wilmington	August 7	20	- -	Unknown
Wilmington	August 20	800	200	Campers
Wilmington	August 20	750	150	Unknown

FRANKLIN COUNTY.

Altamont	August 1	800	$150	Locomotive
Brighton	August 15	200	50	Locomotive
Dickinson	August 16	25	- -	Berry pickers

FRANKLIN COUNTY — Continued.

TOWN	DATE	ACRES	DAMAGE	CAUSE OF FIRE
Dickinson	August 17	30	$75	Unknown
Franklin	August 16	50	25	Locomotive
Franklin	August 17	150	25	Locomotive
Franklin	August 17	200	25	Locomotive
Franklin	August 17	125	50	Berry pickers
Franklin	August 18	100	25	Locomotive
Franklin	August 18	150	25	Berry pickers
Franklin	August 19	85	10	Hunters
Harriettstown	August 6	12	10	Unknown
Harriettstown	August 9	30	- -	Lightning
Harriettstown	August 13	200	80	Locomotive
Harriettstown	August 13	30	10	Unknown
Harriettstown	September 7	25	55	Campers
Santa Clara	August 18	700	100	Hunters

FULTON COUNTY.

Bleecker	October 14	10	$25	Unknown
Caroga	October 15	100	150	Unknown
Mayfield	October 16	15	100	Hunters
Stratford	May 4	75	100	Fishermen
Stratford	May 8	125	100	Fishermen
Stratford	September 16	10	- -	Unknown

HAMILTON COUNTY.

Arietta	August 29	11	$50	Unknown
Arietta	September 18	150	400	Incendiary
Arietta	September 21	25	75	Incendiary
Indian Lake	July 2	25	- -	Unknown
Indian Lake	August 6	500	1,500	Lightning
Indian Lake	August 21	150	25	Hunters
Indian Lake	August 21	150	100	Lightning

HAMILTON COUNTY — Continued.

TOWN	DATE	ACRES	DAMAGE	CAUSE OF FIRE
Indian Lake	September 10	10	$5	Unknown
Indian Lake	September 15	25	5	Incendiary
Lake Pleasant	August 16	40	10	Fallow fire
Lake Pleasant	August 20	125	175	Campers
Lake Pleasant	September 12	10	- -	Unknown
Morehouse	August 10	400	2,000	Picnic party
Morehouse	October 1	85	170	Unknown
Wells	July 21	20	- -	Incendiary
Wells	September 6	80	320	Unknown
Wells	September 10	12	5	Unknown
Wells	September 25	15	5	Incendiary
Long Lake	September 17	120	600	Unknown

HERKIMER COUNTY.

Salisbury	August 18	15	$5	Unknown
Salisbury	August 29	30	15	Unknown
Salisbury	August 31	45	10	Unknown
Salisbury	September 15	75	50	Unknown
Salisbury	October 14	15	10	Unknown
Salisbury	October 16	25	20	Unknown
Russia	August 16	125	25	Unknown
Russia	September 17	28	5	Unknown
Russia	September 17	25	15	Unknown
Russia	September 17	10	5	Unknown
Russia	October 16	30	20	Unknown
Webb	August 15	60	240	Campers
Webb	September 7	300	475	Unknown
Wilmurt	August 1	15	10	Smudge
Wilmurt	August 20	25	20	Incendiary
Wilmurt	August 21	30	20	Incendiary
Wilmurt	August 24	15	75	Unknown

HERKIMER COUNTY — Continued.

TOWN	DATE	ACRES	DAMAGE	CAUSE OF FIRE
Wilmurt	September 1	20	$80	Unknown
Wilmurt	September 17	85	45	Unknown
Wilmurt	October 17	125	50	Incendiary

LEWIS COUNTY.

Croghan	April 28	900	$25	Clearing land
Croghan	May 7	10	- -	Fishermen
Croghan	July —	800	800	Clearing land
Croghan	August 1	750	500	Incendiary
Croghan	August 6	1,600	400	Incendiary
Croghan	August 16	125	50	Incendiary
Croghan	August 17	1,600	2,400	Unknown
Croghan	August 25	80	160	Fishermen
Croghan	September 12	75	225	Unknown
Diana	July 1	4,250	8,500	Unknown
Diana	October 15	800	1,600	Unknown
Greig	April 28	4,250	3,500	Clearing land
Greig	May —	1,100	800	Unknown
Greig	July 2	750	750	Unknown
Greig	August —	80	75	Clearing land
Greig	September 18	225	50	Unknown
Lowville	August 15	950	1,900	Unknown
Lyonsdale	May 9	80	15	Unknown
Lyonsdale	May 10	150	50	Unknown
Lyonsdale	May 10	125	75	Unknown
Lyonsdale	August 1	40	80	Clearing land
Lyonsdale	August 1	700	950	Unknown
Lyonsdale	August 10	40	80	Unknown
Lyonsdale	August 15	20	50	Unknown
Lyonsdale	August 16	800	400	Unknown
Lyonsdale	August 28	650	650	Unknown

LEWIS COUNTY — Continued.

TOWN	DATE	ACRES	DAMAGE	CAUSE OF FIRE
Lyonsdale	September 7	650	$400	Clearing land
Lyonsdale	September 11	50	100	Unknown
Lyonsdale	September 11	260	200	Unknown
Lyonsdale	September 12	12	48	Unknown
Lyonsdale	September 16	10	40	Unknown
Lyonsdale	September 16	300	80	Unknown
Montague	July 20	140	10	Unknown
Montague	August 15	10	5	Clearing land
New Bremen	July 27	25	10	Clearing land
New Bremen	July —	250	175	Unknown
New Bremen	July —	125	50	Unknown
New Bremen	August 5	10	5	Clearing land
New Bremen	August 6	50	10	Unknown
New Bremen	August 17	500	400	Unknown
Osceola	August 15	10	- -	Unknown
Osceola	September 18	10	5	Clearing land
Watson	April 29	1,250	1,750	Incendiary
Watson	May 3	175	450	Clearing land
Watson	May 5	400	400	Unknown
Watson	July 2	125	50	Berry pickers
Watson	August 1	250	80	Hunters
Watson	August 8	1,650	1,650	Unknown
Watson	August 17	10	- -	Unknown

ONEIDA COUNTY.

Boonville	September 12	300	$375	Unknown
Forestport	August 17	225	175	Careless boy
Forestport	August 22	10	30	Unknown
Forestport	August 29	25	15	Unknown
Forestport	September 5	75	75	Unknown
Forestport	September 6	115	45	Locomotive

ONEIDA COUNTY — Continued.

TOWN	DATE	ACRES	DAMAGE	CAUSE OF FIRE
Forestport	September 7	325	$825	Unknown
Remsen	August 17	25	5	Log drivers
Remsen	August 21	35	15	Unknown

SARATOGA COUNTY.

Corinth	June 24	35	$10	Hunters
Corinth	June 29	25	25	Locomotive
Corinth	July 1	25	10	Locomotive
Corinth	July 4	15	20	Unknown
Corinth	July 27	15	10	Locomotive
Corinth	July 30	25	40	Unknown
Corinth	October 21	200	425	Unknown
Day	September 1	625	50	Unknown
Day	October 15	40	10	Incendiary
Hadley	April 29	125	175	Unknown
Hadley	June 25	15	5	Fishermen
Hadley	July 6	10	- -	Unknown
Hadley	August 28	20	10	Berry pickers
Hadley	November 6	30	5	Unknown

ST. LAWRENCE COUNTY.

Clare	October 16	125	$10	Unknown
Clare	October 18	40	5	Hunters
Clare	October 18	75	10	Incendiary
Clifton	August 20	10	25	Hunters
Clifton	October 16	320	40	Hunters
Colton	August 15	20	25	Hunters
Colton	August 29	15	5	Incendiary
Colton	September 6	12	- -	Incendiary
Colton	September 16	50	50	Incendiary
De Kalb	August 20	30	120	Locomotive

St. Lawrence County — Continued.

TOWN	DATE	ACRES	DAMAGE	CAUSE OF FIRE
De Kalb	August 24	125	$225	Clearing land
De Kalb	September 16	15	60	Hunters
De Kalb	October 17	115	80	Clearing land
Edwards	August 15	1,600	400	Unknown
Fowler	August 13	1,500	750	Unknown
Fowler	September 1	125	20	Berry pickers
Fowler	October 16	120	240	Clearing land
Gouverneur	August 6	925	925	Berry pickers
Hermon	August 6	10	- -	Unknown
Hermon	August 17	400	75	Unknown
Hermon	August 18	85	15	Unknown
Hermon	August 19	750	100	Unknown
Hermon	October 16	150	25	Unknown
Hopkinton	August 10	20	5	Smokers
Hopkinton	August 17	110	250	Unknown
Hopkinton	August 18	450	550	Campers
Hopkinton	September 17	30	100	Unknown
Macomb	August 14	600	900	Berry pickers
Macomb	September 15	100	250	Incendiary
Macomb	October 19	20	80	Fallow fire
Pitcairn	July 8	1,575	3,150	Locomotive
Pitcairn	August 6	2,400	3,600	Locomotive
Pitcairn	August 10	6,200	8,000	Unknown
Pitcairn	August 14	3,200	4,800	Unknown
Pitcairn	August 16	825	1,200	Locomotive
Pitcairn	September 17	250	175	Unknown
Rossie	August 14	175	525	Berry pickers
Russell	May 1	10	- -	Fishermen
Russell	May 4	50	-	Unknown
Russell	August 17	250	175	Hunters

WARREN COUNTY.

TOWN	DATE	ACRES	DAMAGE	CAUSE OF FIRE
Caldwell	May 7	14	$75	Smokers
Caldwell	June 5	10	50	Unknown
Caldwell	June 7	100	400	Locomotive
Caldwell	August 28	150	100	Hunters
Chester	June 30	80	275	Unknown
Chester	August 7	40	5	Unknown
Chester	August 8	10	30	Campers
Chester	August 14	15	- -	Smokers
Chester	August 19	200	50	Campers
Hague	July 2	100	200	Smokers
Hague	August 11	575	800	Incendiary
Hague	August 18	15	- -	Fallow fire
Hague	August 18	15	-	Incendiary
Hague	September 13	20	5	Unknown
Hague	September 13	40	160	Smokers
Horicon	August 6	600	500	Incendiary
Johnsburgh	April 10	65	10	Fishermen
Johnsburgh	April 28	10	- -	Clearing land
Johnsburgh	June 26	150	300	Fishermen
Johnsburgh	June 30	75	150	Campers
Johnsburgh	July 11	10	40	Fallow fire
Johnsburgh	July 31	45	300	Locomotive
Johnsburgh	August 1	25	80	Locomotive
Johnsburgh	August 10	25	5	Locomotive
Johnsburgh	August 13	35	50	Incendiary
Johnsburgh	August 17	75	35	Unknown
Johnsburgh	August 27	75	300	Locomotive
Johnsburgh	August 30	20	50	Hunters
Johnsburgh	September 17	20	- -	Unknown
Johnsburgh	September 18	30	25	Hunters
Johnsburgh	September 18	12	- -	Unknown
Johnsburgh	September 18	25	-	Hunters

WARREN COUNTY — Continued.

TOWN	DATE	ACRES	DAMAGE	CAUSE OF FIRE
Johnsburgh	September 20	25	$25	Unknown
Luzerne	May 7	20	- -	Fishermen
Luzerne	July 5	150	80	Incendiary
Luzerne	August 26	10	- -	Fishermen
Luzerne	August 30	20	-	Berry pickers
Luzerne	September 4	15	- -	Lightning
Luzerne	September 17	10	-	Bee hunters
Luzerne	October 16	20	- -	Fallow fire
Queensbury	April 29	75	50	Clearing land
Queensbury	August 19	225	750	Unknown
Queensbury	August 28	40	5	Unknown
Queensbury	September 14	825	1,200	Unknown
Stony Creek	July 2	40	50	Unknown
Stony Creek	September 16	25	25	Unknown
Stony Creek	September 17	30	10	Campers
Thurman	May 6	100	40	Incendiary
Thurman	September 16	110	45	Incendiary
Warrensburgh	August 28	125	50	Clearing land
Warrensburgh	September 15	120	100	Clearing land
Warrensburgh	September 16	10	- -	Smokers
Warrensburgh	September 17	10	-	Smokers
Warrensburgh	October 16	40	10	Fallow fire

WASHINGTON COUNTY.

Dresden	May 9	65	$90	Unknown
Dresden	August 28	25	95	Campers
Dresden	August 29	40	125	Hunters
Dresden	August 30	15	30	Unknown
Dresden	September 17	25	90	Unknown
Fort Ann	April 29	40	85	Unknown
Fort Ann	August 6	600	80	Campers
Fort Ann	August 19	85	85	Campers

WASHINGTON COUNTY — Continued.

TOWN	DATE	ACRES	DAMAGE	CAUSE OF FIRE
Fort Ann	August 21	10	- -	Hunters
Fort Ann	August 25	30	$25	Smokers
Fort Ann	August 25	25	10	Unknown
Hampton	May 9	50	40	Hunters
Hampton	August 19	40	50	Unknown

CATSKILL COUNTIES.

DELAWARE COUNTY.

Andes	June 13	100	$50	Unknown
Davenport	May 7	600	100	Unknown
Delhi	April 30	50	50	Unknown
Hancock	May 3	175	450	Unknown
Hancock	May 8	350	850	Berry pickers
Hancock	October 14	275	550	Fallow fire
Tompkins	May 10	125	85	Unknown
Tompkins	October 14	625	475	Clearing land

SULLIVAN COUNTY.

Fallsburgh	April 20	150	$25	Hunters
Fallsburgh	June 19	15	10	Locomotive
Fallsburgh	June 22	20	40	Hunters
Fallsburgh	June 22	20	45	Fishermen
Forestburgh	May 4	80	125	Locomotive
Forestburgh	May 25	600	825	Clearing land
Lumberland	April 30	175	100	Smokers
Lumberland	May 9	180	100	Fallow fire

ULSTER COUNTY.

TOWN	DATE	ACRES	DAMAGE	CAUSE OF FIRE
Olive	April 22	420	$150	Fallow fire
Olive	April 25	80	100	Unknown
Olive	April 29	160	200	Incendiary
Olive	June 6	45	140	Hunters
Shawangunk	April 24	40	180	Unknown
Shawangunk	April 30	10	25	Unknown
Shawangunk	May 2	40	10	Unknown
Shawangunk	November 10	180	180	Unknown

RECAPITULATION BY COUNTIES.

COUNTY	NUMBER OF FIRES	TOTAL ACREAGE BURNED OVER	DAMAGE TO STANDING TIMBER
Clinton,	8	1,825	$1,005
Essex,	43	8,795	6,630
Franklin,	17	2,912	715
Fulton,	6	335	475
Hamilton,	19	1,953	5,445
Herkimer,	20	1,098	1,195
Lewis,	49	27,222	30,003
Oneida,	9	1,135	1,560
Saratoga,	14	1,205	795
St. Lawrence,	40	22,882	26,965
Warren,	54	4,726	6,435
Washington,	13	1,050	805
Delaware,	8	2,300	2,610
Sullivan,	8	1,240	1,270
Ulster,	8	975	985
	316	79,653	$86,893

Of the 79,653 acres comprising the burned areas, 4,774 acres — less than six per cent — belonged to the State.

In addition to the damages to standing timber and young growth, estimated here at $86,293, there was a further loss in fences, barns, buildings, logs, pulpwood, and cordwood, amounting to $16,883.

The aggregate number of days worked at these fires, as reported by the firewardens, was:

Firewardens,	1,736¾	days, at $2.50,		$4,341 87
Men,	18,562¾	days at 2.00,		37,125 50
Teams,	55	days at 3.50,		192 50
		Total wages paid,		$41,659 87

That the increase in the number of fires, and consequent losses, in 1899, was due largely to the excessive drought that season, is evident on comparing the returns with those of the previous year.

	1898	1899
Number of acres burned over,	9,118	79,653
Damage to standing timber,	$7,030	$86,893
Number of different fires,	94	316

CAUSES OF FIRES, 1899.

Clearing land or burning fallows,	40
Railroad locomotives,	27
Incendiaries or careless persons,	29
Hunters,	25
Fishermen,	12
Camp fires,	17
Berry pickers,	14
Tobacco smokers; matches,	11
Lightning,	10
Burning house,	2
Picnic party,	1
Insect smudge,	1
River drivers,	1
Children,	1
Burning garbage,	1
Unknown or not reported,	124
	316

The foregoing tables include only such fires as showed a burned area of ten acres or more. In addition there were a very large number of small ones that were extin-

guished before any headway was attained or damage done. The reports of these small fires, which are omitted here, speak well for the watchful care exercised by many of the firewardens.

To many, doubtless, it will seem strange that with so large a burned area the amount of damage is not placed at a greater sum. In explanation it may be said that a large number of the fires occurred, not in any forest, but on tracts of waste land where there was no standing timber. Many of these tracts had been burned over before, some of them repeatedly, until there was nothing left to burn except ferns, wild grass, or the dead, charred stubs that told of former fires. Part of the fires swept over barren plains that for years had produced nothing but weeds and briers. There were wide openings, miles in extent, on which there was little growth aside from the blackberry and huckleberry bushes which tempt the natives to burn these grounds over to increase the yield of wild fruit. Then there were old abandoned farms and clearings, covered with a scrubby growth of no value, but which took fire quickly through any accident or carelessness. All these burnings, many in number and wide in area, are included in the foregoing tables; and this is why, in some instances, the firewardens report a burned area, but place the damage at nominal figures or nothing at all.

This measure of damages will be better understood if it is remembered that spruce land, virgin forest, in the Adirondacks is worth about eight dollars per acre, that being the highest price paid by the State for large tracts, heavily timbered, well located, and on which no lumbering has been done. With few exceptions, no fires occurred in 1899 on forest land of this character. It should be borne in mind, also, that hardwood forests, from which the merchantable spruce has been removed, is worth about one dollar and fifty cents per acre, the State having bought over 100,000 acres of this class of woodlands from various persons during the last four years.

Now, it is evident that, in estimating the loss per acre, any damage to the standing timber by fire cannot be placed at a higher figure than the combined values of the land and timber; and that the estimated loss should not be computed by any future or prospective values, but should be based on the present market price of the land.

Instead of underestimating the damages to standing timber, some of the firewardens evince a tendency to exaggerate the loss. In some cases the amount of damage reported, when divided by the number of acres burned over, showed a price per acre many times that of the assessed valuation of both land and timber combined,— in one case nine times as much. On account of these or similar misstate-

THE FIRE ON BLACK BEAR MOUNTAIN,

NEAR SEVENTH LAKE, FULTON CHAIN, HAMILTON COUNTY, AUGUST, 1899.

ments, unintentional though they may be, the firewardens' reports have undergone a careful censorship before tabulation, some of them having been returned for the correction of errors that were plainly evident.

As a sample of what is required in the way of a report, the following printed form is given here, it being a copy of one received from a firewarden during the last season, properly filled out. The answers to the printed questions, which were written in by the firewarden, appear here in italics.

STATE OF NEW YORK.

Fisheries, Game and Forest Commission.

REPORT OF FIRE.

(As required by Sec. 277 of the Fisheries, Game and Forest Law, Chap. 655 of 1896.)

Town in which fire occurred, *Stratford*, County of *Fulton*.
Date when fire started, *May 8, 1899*.
Date of stopping of fire, *May 9, 1899*.
Number of acres burned, *One hundred and twenty-five*.
State what part, if any, are State lands, *Not any*.
Lot number, *Lot 61 and a part of Lot 32*.
Township number or Tract name, *Jerseyfield Patent*.
Value of standing timber destroyed, estimated, *One hundred dollars*.
Value of cordwood, logs, bark and other forest products destroyed, *$25 worth cordwood*.
Value of bridges, fences and buildings destroyed, *Not any*.
Cause of fire, *By hunters, as near as I could learn*.
Measures employed to check and extinguish fire, *Carrying water, whipping out the ground fires with brush, digging trenches, and backfiring*.
Number of days' attendance by myself, *3*.
Number of men called out to fight fire, *16*.
Total number of days' labor by men called out, *27*.

REMARKS:

This land had been lumbered recently, and the tops had been cut up into cordwood. If the fire had not been stopped promptly it would have run over a thousand acres or more of very good timber land. I have tried to find out who is starting these fires, but as yet am unable to learn.

Signature, *Netus Lancaster*,
Fire Warden,
P. O. Address, *Stratford*,
County of *Fulton*, N. Y.

NOTE.— Report each Fire on separate Blank. Report must be made immediately after fire is extinguished.

Each firewarden is supplied with these printed blanks, and after a forest fire in his town he is expected to forward his report as soon as possible.

The story of the great fires in 1899 is best told in the remarks attached by the firewardens to their respective reports, which tell plainly of the vast extent of the burned territory, the unusual drought, the alarming frequency of the fires, the methods employed to extinguish them, and the various difficulties under which the men labored. People who have had no experience in fighting forest fires can gain a fair idea of the nature of the work by a careful perusal of the following extracts which have been culled from the reports of the firewardens:

Mr. E. A. Howes, firewarden for the town of Tompkins, Delaware county, N. Y., reports:

October 14, 1899. This fire was set by one E. Washburn and one Stephen Walley in brush heaps on their land, from which it escaped into the woods, where it destroyed a large amount of timber. We extinguished it by getting ahead of the flames and backfiring. I ordered out twenty-five men. The fires were started in two places by different parties, about one mile apart, on the same day. They burned their brush heaps without giving any notice, or obtaining any permission from the firewarden. There are too many of these kind of people who pay no attention to the rules of the Forest Commission, or to the law. Both men were prosecuted and fined in December, 1899. Stephen Walley paid a fine of $50 and Ernest Washburn paid $40.

October 16, 1899. Damage to timber estimated at $300. This fire escaped from the lands of E. Niles, who was burning brush heaps on a dry, windy day. He made no attempt to check it. He was arrested and paid a fine of $20.

Mr. Arza R. Turner, firewarden for the town of Dannemora, Clinton county, N. Y., reports:

June 20, 1899. This fire was on Township 5, Old Military Tract, and was caused by a man who burned his fallow without notifying me. I ordered out two men only, and we had no difficulty in extinguishing it by clearing away the lands and brush ahead of the flames. It was started by John Agonz. I discovered it soon after it started, and called out two men, Ben. St. Jermain and George Manley. We stopped it before it did any damage. It is very dry here now, and there is much danger if a fire once gets the start.

June 21, 1899. This fire was caused by some men in the employ of the Chateaugay Ore and Iron Company, who were burning logs, stumps and brush in order to clear up a grove for picnic ground. They had about twenty-five men at work clearing up the land, and guarding against the spread of fire by the use of water and shovels, and raking away the rubbish. The company are clearing up quite a large piece of land for a pleasure resort at the head of Chazy lake. They have plenty of men there, and are now very careful not to let the fire spread. I went up there Friday and stayed over until Saturday. I do not think that there is any danger now.

Mr. George S. Lindsay, firewarden of the town of Chesterfield, Essex county, N. Y., reports:

September 15, 1899. Number of acres burned, 35; timber destroyed, estimated at $40. Caused by locomotive on the D. & H. railroad. Ordered out twelve men. The D. & H. railroad runs through this town at a distance of about ten miles, along a mountain side, where the timber has already been killed by previous fires, affording excellent material for fire in a dry town.

Mr. Carlos A. Jordan, town of Elizabethtown, Essex county, N. Y., reports:

August 18, 1899. Number of acres burned over, 750, part of which was in the towns of North Hudson, Moriah and Elizabethtown. Value of standing timber destroyed, estimated at $1,500. No bridges, fences or buildings destroyed, but a shanty in Moriah was burned. I heard that the fire was set by a party of campers. The burned tract lies east of the Old Military road going from Elizabethtown to Schroon Lake, and west of the State road going from Elizabethtown to Moriah.

Charles Bartlett, town of Jay, Essex county, N. Y., reports:

May 17, 1899. Two acres. No timber injured, but about $10 worth of fences were destroyed. Called out eight men; dug trenches, shoveled dirt, and carried water in pails. This fire was caused by the burning of Le Grand Hathaway's house, on the road leading from Ausable Forks to Jay village. There was a strong east wind at the time, which blew pieces of burning shingles thirty to forty rods, starting a fire in a piece of woods, and before we could check it the fire got into a fence made of pine rails, burning about twenty-five rods of it.

June 14, 1899. About seventy-five acres; no State land. Used teams to plow furrows, while men worked with shovels or hoes, and carried water in pails. This fire was on the land of J. & J. Rogers Co., where the timber has been cut off for pulpwood and other purposes. Unable to ascertain the cause; but am satisfied that it was due to negligence, as there is a road running through the land where this fire occurred. Think some one must have dropped a lighted match or cigar.

August 9, 1899. This fire started in the town of Chesterfield, and ran over the line into Jay. We dug trenches, drew water, plowed furrows and backfired. I ordered out eleven men; total number of days worked, fifty-seven. On crossing the town line it went into John Gary's district. He called out men and extinguished the fire, as he supposed; but it broke out several different times, as it was so very dry. The fire would run in the duff and not show itself until some wind would start it up again. Mr. Gary did not report the fire to me as instructed, and that is the reason why it was not reported before.

Mr. Charles W. Cutting, town of Lewis, Essex county, N. Y.:

August 8, 1899. Fire ran over about five acres on Lot 150; supposed to have been started by some one who was smoking. We extinguished it by digging trenches and shoveling on dirt. Ordered out seven men; total number of days labor, seven. This fire was in an old slash, but we stopped it before it got into the standing timber.

August 20, 1899. This fire ran over one hundred acres, destroying about $25 worth of timber. In addition there were a loss of buildings and fences of $450. It caught fire from

a burning house. We had to backfire to save two dwelling houses. Warned out forty-one men; one hundred and twelve days worked. There were one hundred acres of meadow and pasture land, forty acres of which was on a dry mountain slope, on which there was no timber; nothing but little, small brush. There were ten acres on which there was some pine timber.

Mr. R. H. Wilson, town of Minerva, Essex county, N. Y.:

May 9, 1899. Number of acres, twenty; on Lot 12, Township 26, Totten & Crossfield's purchase. No State land. No standing timber destroyed. This fire was set by a man who was in the employ of Daniel Heffran. He was at work cutting brush, and, after he had worked at it a little while, he thought he could do it easier by burning it off, and so he started a fire, with the above result. I went and looked the ground over, and as near as I can judge there were about twenty acres burned; but there was no timber on it. It was covered with small brush of no value. The men worked hard to check the fire and keep it out of the big timber.

August 2, 1899. This fire is supposed to have been caused by some one going along the road smoking, who threw his cigar out on the side of the road, which started a blaze. The flames went like the wind, but within half an hour there were about thirty men there at work who whipped the fire out where it was running in the grass. If it had once got a good start there is no knowing what damage it would have done. After the fire was checked we carried water and drenched the ground.

August 6, 1899. Twenty acres; all State land. District Firewarden Brannan and I were both present. He called out fourteen men; total number of days labor, forty-five. The above fire was caused by lightning. It was on the southeast part of the lot. There is some very nice timber on this lot, but the fire was checked before it did much damage. As near as I can estimate there were about one hundred market logs of spruce destroyed.

August 17, 1899. One acre burned over; State land. Standing timber was of very little value, as it was on a poplar knoll, on which there was a little balsam and spruce also. District Firewarden Keyes was present, as well as myself. This fire was, as I have learned, started by a hunter named Seaford, who was boarding at the Aiden Lair Hotel. He has a small camp at Hewett Eddy, and neglected to put out his camp fire, as it is plainly shown that the fire started from his camp. The man claims that he put out his fire; but there is no question in my mind but what he is responsible for it. I should like to see an example made of some of these careless hunters. I wish you would see that this is investigated soon, as it will cause others to be more careful.

August 21, 1899. About 150 acres; on Lots 21 and 22, Township 30. No timber burned. There was no timber on these solt, nothing but small brush of no value, in my estimation.

September 7, 1899. One hundred and seventy-five acres; damage estimated at $15. This fire ran along some ridges that were burned over years ago, leaving nothing there of value; but there was good timber on each side; and we ditched around the fire and kept it from running into these woods. It has been an awful time to fight fire this summer, because it is so dry, and there is no water. Still, we did the best we could.

September 16, 1899. One hundred and fifty acres; Lot 7, Township 16. Estimated damage, $25. I was notified of this fire by the North Woods Club. I got a crew of men and went there immediately; but had just got to work in good shape when the rain came.

It was quite a relief to me, as we would have had an awful time if it did not come. The fire would very soon have been in good timber, where it would have done a great deal of damage. Mr. Robert Bibby, superintendent of the North Woods Club, looked the ground over for me since, as it was about twenty miles from my place, and this is about the way he reported it to me.

Mr. Alvin Winslow, Fish and Game Protector, at Stony Creek, Warren county, N. Y., writes under date of June 28, 1899:

I have investigated the fire on Lot 12, Township 26, Totten & Crossfield's Purchase, reported by Firewarden Wilson; and also the one on Lot 67, Township 11, reported by William Merrill, firewarden for the town of Johnsburgh, and find that in each case the facts are the same as reported. No timber was burned and no damage done. I talked with Mr. Heffran about the fire on Lot 12, and his statement agrees with the report of the firewarden. The young man that started this fire, and who was working for Mr. Heffran at the time, had left, and so I did not see him. I talked with Mr. Dalaba about the fire on Lot 67, Township 11. He admitted starting it, but claimed that he did not understand that a person was liable to a fine for starting a fire on his own land, unless it got out and did some damage. He is quite an old man and was considerably frightened about the matter. I think he will not start any more fires out of season.

Mr. Warren H. Broughton, town of Moriah, Essex county, N. Y.:

August 20, 1899. One hundred and fifty acres burned over. Value of standing timber destroyed, estimated at $550. I warned out eighty-three men, who worked 101 days, plowing and backfiring. Three men were seen running from the place when the fire broke out. They were chased a considerable distance, but not caught.

August 22, 1899. This fire broke out several times after we thought it was completely extinguished.

Mr. Byron R. Brewster, town of North Elba, Essex county, N. Y.:

May 15, 1899. This fire was started by James Peacock, who was burning brush on his own land, in violation of the law which forbids the setting of any fallow fires at this time. He was arrested by Mr. Fletcher S. Beede, the Fish and Game Protector, and fined $50 and costs.

June 13, 1899. Two acres; on Township 12. Timber destroyed, $10. Caused by a man who was clearing land and burning brush near the lot that Stevens Bros. cut wood on last winter. I cannot tell exactly the number of days worked, as I was unable to find out how many men were at this particular place. The town was all on fire, and men were going from one place to another fighting the flames.

August 2, 1899. Two acres; on Lot 235, Township 11. Does not belong to the State. Timber destroyed, $15; cordwood and pulpwood, $10. This was caused by some sportsmen, who built a fire in getting their lunch. It was on the side of a ledge on the east shore of Lake Placid; but I managed to check it so that it burned over only about two acres; it was near State land. It was quite expensive, as you will see when we send in our bill for rebate. We had to hire boats to cross the lake in order to get to the place.

Mr. John W. Shandrow, town of North Hudson, Essex county, N. Y.:

August 13, 1899. Number of acres, 250; Lots 170, 171 and 172 Paradox tract. Timber destroyed or damaged, $75; value of fences burned, $10. Number of days attendance by myself, seven; number of men called out, twenty-five; total number of days worked, seventy-seven and one-half. This fire was mostly on a small mountain, and we dug a ditch, which prevented it from spreading. It was so dry that it was impossible to get water, and the ground burned to the rock. The land was covered mostly with a growth of small hardwood. Lot 171, State land; Lots 170 and 172 are owned in undivided interests by the State and the Crown Point Iron Company.

Mr. Baron Ling, town of St. Armand, Essex county, N. Y.:

August 13, 1899. About one acre burned over. Warned out eight men. This fire, which was on the bank of the river, was started, I think, by some hunter. The reason why I did not report before was because the fire was in the duff and we could not put it out. So I kept watch of it for seven days, until the rain came. We stopped it before it did any damage.

September 1, 1899. Number of acres, 125; only two acres of standing timber, the damage to which is estimated at $5. Called out two men; they extinguished it by whipping the flames with brush and throwing water on the ground; plowed a furrow around it also. This fire was caused by carelessness in leaving a camp fire burning. This fire had been smoldering a long time before I was notified about it. I went there immediately and found it running to the east, with a west wind. We could not work in front of it on account of the smoke; but we stopped it on the west side. It burned as far as the green timber on the east, which checked it. It still smoldered in an old slashing, and in the rotten logs, until rain came and extinguished it.

September 1, 1899. Another separate fire on the same day occurred in Township 11, which ran over 150 acres. I left it in charge of E. M. White, telling him to call out what help he needed. I told some men who were cutting hay on the meadows near by to backfire around their stacks in order to save them from being burned. They said the fire could not reach the hay, and paid no attention to my suggestion. As a result, the fire burned about twenty tons of wild hay that was stacked, worth $5 per ton, and a large amount of standing hay. The fire was caused by a locomotive on the Chateaugay railroad.

September 20, 1899. Number of acres, fifty; timber destroyed, $15; number of men called out, nine; total number of days worked, thirty-five and one-half. It started from a camp fire on Lot 90; and another started at the same time on Lot 68, the two running together so that we had to fight it as one fire. Some timber was killed on Lot 68; but this is not a complete loss, as it can be cut this coming winter.

Mr. E. C. D. Wiley, town of Ticonderoga, Essex county, N. Y.:

April 29, 1899. Number of acres burned, seventy-five; timber destroyed, $75; warned out fourteen men, who worked nineteen days in all. Fire caused by a party clearing a garden spot near the shore of Lake George. Sparks caught at the edge of the mountain and spread so rapidly that it was necessary to call out the people. We saved about fifteen cords of stove wood and half a mile or more of line fence. The fire was extinguished just in time to save a large tract of timber; also two summer cottages and a large hen house.

A FIRE SLASH.

These trees fell because their roots were eaten off by fire which burrowed under ground in the "duff" or leaf mold. The timber was not charred or even scorched, and was available for merchantable purposes or fuel.

August 6, 1899. Number of acres burned, over 550; on the Hague tract, Ellis patent. Value of standing timber destroyed, $1,050. Total number of days worked, 104½. This fire was started by berry pickers. A good portion of the land had been burned over before. It was so terribly dry that it was impossible to extinguish it completely until we had rain. I hope this is the last fire we will have in a long time. Old inhabitants here say that we have never had such a dry season as this. There have been several fires this year, and, it being so dry, if they had not been promptly attended to we would not have had any timber lands left, as we had a fire in all parts of the town. We had a very hard job to prevent this large one from destroying all the forests in this vicinity.

Mr. William Ormiston, town of Westport, Essex county, N. Y.:

July 1, 1899. Number of acres burned, twenty-five; no standing timber destroyed, as it was all small second growth; fences burned, $15. The fire was caused by a locomotive on the D. & H. railroad. The section men from the railroad helped fight this fire. We stopped it within a few rods of the timber.

August 14, 1899. Number of acres burned, seventy-five; damage to timber, $25; barrier fences destroyed, $50. Ordered out thirty-one men; total number of days worked, seventy-one and three-fourths. Fire was caused by locomotive. It did not do much damage as the ground was covered with small second growth, and it was stopped before it reached the timber. It is so dry here that it is hard to stop a fire. The only way we can control it is to dig trenches.

Mr. Henry Morgan, town of Wilmington, Essex county, N. Y.:

August 20, 1899. Number of acres burned, 800; value of standing timber destroyed, $200. In addition, 1,000 cords of pulpwood were burned. I ordered out ninety-three men, who worked in all 616 days. We worked night and day to keep it off from the other lumber jobs. This fire started in a pulp job near the trail that goes up White Face mountain. It started in an abandoned lumber camp that has not been occupied since last March. Four houses and barns were burned. It was the worst fire ever seen in the town by the oldest residents. Being on a steep mountain side it was difficult to control it. Everything was very dry; no water; all the brooks dried up. The fire burned in the muck until the 19th of September, when a rain came that lasted two days and nights. There was not much timber on the land aside from the 1,000 cords of pulpwood which were destroyed. The rest of the ground was covered by an old slash and dead timber, and made a very hot fire, forcing us to keep on the outside, where we held it inside the ditches. There was no moisture in the ground owning to the drought. Springs dried up that never failed before, and there were trout brooks of a large size in which we could hardly find a place to get a drink of water, I have been hampered and opposed by the taxpayers, who charge me with putting on useless help and making unnecessary expense. I believe I have done as much with the men I put on as any warden in the county. The whole row and fuss is caused by the former firewarden. If you will write to Mr. Madison Baldwin, timber agent of the J. & J. Rogers Co., you can find out the facts.

On the night of August 27th a fire started from a spruce tree which was struck by lightning, but it was extinguished before any damage was done.

Mr. E. H. Severance, town of Willsboro, Essex county, N. Y.:

June 17, 1899. Number of acres, twelve; damage to timber, nothing. It being a very dry time with us we were fearful of a very extensive fire; but we soon got it under control. I then kept two or three men on the ground for several days — and nights as well — until rain came and helped us out.

Evreste Le Boeuf, town of Altamont, Franklin county, N. Y.:

August 1, 1899. Number of acres burned over, 800; timber destroyed, $200; logs, bark and cordwood, estimated, $75; fences, $50. Total number of days labor, 1,194¼ This fire started in two places; in the swamp, near the road, from a locomotive, and also from the great fire which destroyed Tupper Lake village on the night of July 31st. We were obliged to keep a large force of men at work or on watch for several days around the border of the burned territory, as the muck and duff held fire, and it was impossible to put it out. It smoked and smoldered there until the rains came.

Mr. Benjamin A. Muncil, town of Brighton, Franklin county, N. Y.:

August 15, 1899. Number of acres, 200; value of timber destroyed, $50; location, on Lots 87 and 23, Township 18, Macomb's Purchase. This fire was started by sparks from the M. & M. railroad. We fought it by shoveling dirt, and drawing water, where it could be had. I ordered out eighty-two men and was present myself eight and one-half days. Total number of days worked, 154. On August 21st a heavy shower checked the flames and assisted us materially. The fire in the muck broke out again on the 25th, and was not finally extinguished until September 2d. Very little good timber was destroyed in this town, the fires being confined to old burns and swamps.

Mr. James W. Sabin, town of Dickinson, Franklin county, N. Y.:

August 17, 1899. I could not stop this fire until it came near the river. We then carried water and saved a sawmill. I did not order out any men, as the work was done by sawmill hands. I do not know how many days these men worked as it was all volunteer help.

Mr. Henry N. Paye, town of Franklin, Franklin county, N. Y.:

August 17, 1899. Number of acres, 125; timber destroyed, $50. This fire was attended to by Mr. Skiff, the district firewarden, who was in charge. It was caused by berry pickers. It burned mostly in the marsh and muck. We went in at five o'clock in the morning, and supposed we had it all out, but it broke out again in the duff, and on the 19th I sent some men with a team and plow, who ran furrows around it as far as they could. They also hauled water in barrels, placing them along the plowed ground. On the 20th the wind was from the north, and so the fire did not spread that day; but on the 21st it blew from the south, driving the fire so hard that we called out forty men in the afternoon to stop it. The change in the wind on the 20th helped us to save a number of buildings that otherwise must have burned.

On the same day the fire that started in the town of St. Armand, caused by a locomotive on the Chateaugay railroad, crossed into our town. We hauled water along the highway which runs from Bloomingdale station to Brighton, and succeeded in preventing it from crossing the road. I notified the firewarden of the town of St. Armand to attend to it, but he paid no attention to the matter until the 19th. He then came up there and

looked around and went back without warning out a man to help fight it. I was there when he went by. On the 18th I was on the railroad at the town line of Franklin and St. Armand when the Chateaugay train came down from Saranac Lake. That train started two fires, one within thirty feet of me, and one about thirty rods farther down the track. We put them both out.

August 17, 1899. I went yesterday and looked over the lots which were burned, and find that there was no timber on the land, nothing but slash and bushes. I have been sick or I should have made this report earlier. Part of the men called out to fight this fire were in the employ of the Chateaugay Railroad Company. Will they be entitled to pay for their services? The fire was on their land and set by them. Please let me know about this.

August 18, 1899. Number of acres, 150; damage to timber, $25. Location, Lots 100 and 101, Township 10, Old Military Tract; all slash lands and barrens. This fire was started in a camp of berry pickers, who left their fire burning when they went away. I have tried to find out the names of this party, who were encamped at the Goldsmith place. No one seems to know their names, or where they were from. Will you please inform me how many hours you consider a day's work?

Dr. B. E. Fernow, Acting Firewarden, town of Santa Clara, Franklin county, N. Y., reports as follows:

August 18, 1899. Number of acres burned, 900; on Township 23, near Fish Creek ponds. Value of standing timber destroyed, $100; but of promising young growth and saplings, $1,000 at least. Number of men called out, 18 at first, up to 100 part of the time. Total number of days labor, 289 days, plus 30 days teaming. Fire was first observed by surveying party on August 15th in a large opening, a sandy flat which had resulted from a series of previous fires. This flat was bordered to the south by a sphagnum bog, usually wet, this season absolutely dry; and by wooded knolls and slopes in other directions. The fire when discovered was checked and patroled for three days, and on August 18th, at eleven A. M., it was reported by two experienced woodsmen (patrols) as absolutely out.

At noon a surveying party passing nearby discovered smoke in the same direction, and repairing to the spot, found a lively fire running in the brakes, which they attempted to put out without success, a strong wind fanning the fire and driving the party off. An enforced party of eight with spades was sent out at six o'clock and kept the fire in check to some extent, but could not prevent its progress into the sphagnum bog, over which it ran with furious rapidity. At about eight o'clock P. M. the writer arrived at the fire, and, dividing the crew into two watches, utilized the night to beat out the fire along the line, the coolness, absence of wind and dew of the night being most favorable for effective work, so that in the morning the fire seemed to be subdued but for some smoldering spots here and there and burning stumps and falling trees on a hardwood ridge, these forming separate breeding places for fire. In the morning, assistance, which had been sent for, arrived, and besides putting out the smoldering spots here and there, ditching around the hardwood ridge was begun, the sandy ground on the northeast and north being quite favorable for ditching and backfiring; the wind being southwesterly, this was the most endangered direction.

In the south, where the bog prevented such measures, an attempt to keep the fire back by beating out and backfiring became hopeless when in the afternoon the wind changed to northwest and stiffened, and towards evening the fire was running in the moss and Labrador Tea brush of the dry bog. Again the coolness and dew of the night was utilized to beat out the fire on this side, with success. During the night further assistance arrived from Tupper Lake (twenty-four men) and from the camps of the Santa Clara Lumber Company (fifty men). The line of fire by Sunday morning was at least four to five miles long, having started up again at many points in all directions. The wind being now from the north, the north line was left to itself, the ditch promising to hold it; and the breeding places in the ground, stumps and logs, where ditching was impossible, were individually attacked with mattock, axe and shovel.

In the afternoon when the wind again strengthened, the battle became hopeless; and while at the ditch to the north by backfiring the conflagration had been successfully confined, at the south the fire in the bog had again broken out, and, running across it, entered the woods along the whole line. In the evening an attempt was made to backfire from a logging road, but, owing to the dew, it was practically impossible to make a fire run; fires could be kept up only with difficulty, and refused to spread, so that this method was abandoned.

On Monday morning a ditch was thrown along the whole southwest line through a hardwood ridge, and, the ditch in the north having been jumped by the fire in several places, an attempt was made to circumvent the fire again with a ditch. The attempt would have been successful if the wind had not veered, driving the fire northward and chasing the workers away, who found themselves surrounded by fire, and escaped only with difficulty. At about three o'clock all control towards north and east lines had to be abandoned, the fire driving with fury in those directions, being stopped only by the downpour of a heavy thunder shower at seven P. M.

Roadmakers, encamped near the new road from Saranac Inn to Wawbeek, in fear of their camp, backfired from the road on the east side towards the fire, and, being unable to control their backfire, the other side of the road also took fire, endangering the cottages on Saranac Lake. This fire was ditched, however, and, with the aid of the rain, confined to a small acreage.

Although several days following were cloudy and damp, if not rainy, the fires in logs, dead trees, stumps and ground continued to smolder and required patrolmen for several days to put them out.

At this writing (September 11) the fire has again broken out in two places, requiring attention.

The unusual dry season, the sweep of winds in the open, and the heat in the middle of the day, conspired to increase the dimensions of a fire which would otherwise, with the force of men at work, have been kept within more reasonable limits.

There being seven other fires going at the same time on the property, not all the force at command could be concentrated on this one, although it was hardly within human power to have stayed its progress when it ran before the wind.

The damage done is comparatively small; hardly any merchantable or tall timber suffered, although quite an amount of young, promising pine and spruce growth has been destroyed, and some portions of a balsam and cedar swamp burned out.

FIGHTING FIRE.

Surface fires in the fallen leaves and dead wood are often checked by throwing dirt on the burning material. This is resorted to when there is no water at hand.

Mr. Grant Bruce, town of Harrietstown, Franklin county, N. Y.:

September 7, 1899. This fire was started by some campers from a neighboring hotel. Ordered out thirteen men; total number of days worked, fifty, not including myself. We also had a team, which was in use six days. This fire was reported on September 7th, at which time I was informed that it was being efficiently fought by a party of men sent up from the Rustic Lodge and from some camps near by. As they failed to extinguish it completely, I sent over a party of five men from Axton; but the heavy layer of duff, the open condition of the woods, and the severe drought, made the fight very difficult. Before the progress of the fire could be stopped a large part of the south slope of Panther mountain was burned over and considerable of the timber along the edge of the open brush woods was destroyed.

Mr. W. A. Walton, supervisor of the town of Harrietstown, Franklin county, N. Y.:

August 21, 1899. Number of acres, two; damage to timber, nothing. As all the fire-wardens on that day were in other sections of the town fighting fire, the situation was a critical one. My attention having been called to it, as supervisor, I warned out fifty-nine men to put this fire under control. Hose was borrowed from the village of Saranac Lake, and water was conducted as near as possible. By digging trenches, shoveling on dirt, and using water, the fire was extinguished.

Mr. F. W. Abrams, town of Arietta, Hamilton county, N. Y.:

August 29, 1899. Number of acres, eleven; value of timber destroyed, fifty dollars; also about two hundred cords of hardwood. Location, Township 3, Moose River Tract: no State land injured. I received notice on August 29th that fire was raging at Pillsbury lake; summoned a crew of men and started immediately; but, on reaching Pillsbury, we found no traces of fire. We then went to Whitney lake, where I met a man who had just come from Sampson lake, and who reported no fires in that section. He said there was a fire on the "cobbles" below Grassy brook; went there immediately; found a fierce fire raging in the spruce timber and a man watching it. He was making no effort to stop it; did not learn who he was. We went to work at once and felled a belt of timber; cleared out all down trees and rubbish anywhere nearby. We succeeded in holding the fire right where we found it and preventing it from spreading. Notified Superintendent Fox immediately. In company with my men I had to travel twenty-seven miles to reach this fire; impossible for men to board themselves; hence, I ordered supplies brought in, for which I will send a bill.

September 18, 1899. Numbes of acres, 150; damage to standing timber, $400. About 200 cords of spruce pulpwood were destroyed. While fighting this fire I discovered another one about one-quarter of a mile distant on a spruce knoll, a report of which is inclosed herewith, marked No. 2. There was no wind blowing, nor any other means of communication between this fire and the one just reported. Both were evidently started by an incendiary.

September 21, 1899. This fire was discovered by a couple of hunters, who made an effort to extinguish it, but failed. We arrived in time to prevent it from doing any damage, although it had just got started in some large spruce timber.

Mr. W. H. Lawton, town of Hope, Hamilton county, N. Y.:

August 21, 1899. Number of acres, two; damage to timber, nothing. Ordered out three men. This fire when first discovered had apparently been burning some time. It was in a small field of some two or three acres, with an old log shanty standing in the center, which was burned down. The fire had spread nearly all over the field, burning in the mucky ground in such a way that it was about impossible to extinguish it. Owing to the continued dry weather I found it necessary on September 19th to look after it again. On the 20th and 21st we had the heaviest fall of rain of the season, after which it did not need further attention.

Mr. Robert B. Nichols, town of Indian Lake, Hamilton county, N. Y.:

August 6, 1899. Number of acres, 500; value of standing timber destroyed, $1,500. Location, Township 17; number of men ordered out, 43. Perhaps you would like to know why the fire burned so many acres when there were so many men fighting it. It burned nearly all this territory before I went to work at it, as I had no authority until Col. William F. Fox, Superintendent of Forests, came here and appointed me firewarden. Then I ordered out men and surrounded the fire as soon as possible. But it had burned over so much ground I had to keep quite a crew at work all the time to prevent it from spreading, until the fall rain set in. There were several other fires in this town, which I will report as soon as possible. But as all the small and large brooks in the town were dried up, it was impossible to extinguish the fires entirely; so, in each instance, I left from two to eight men on watch, who kept throwing on fresh dirt and opening up ditches; otherwise they would have broken out again.

Some of these fires were started by lightning, and two of them by campers. There were so many different fires going at the same time it was hard for me to attend to them all; but I got some good, trusty men, one of whom I appointed as a foreman over each crew. Then I went around from one gang to another and assisted personally where the fire was the worst. It will be difficult for me to estimate the damages until I have an opportunity to go carefully over the ground in each case.

September 10, 1899. Acres burned, one. Mr. J. E. Brown saw smoke arising from this fire, and went there with two men.

Mr. B. F. Merwin, town of Long Lake, Hamilton county, N. Y.:

August 21, 1899. Number of acres, 150; damage to timber, $25. Location, Township 19, Totten & Crossfield's Purchase. This tract had all been cut over last winter, and there was little timber standing of any value. I ordered out sixteen men; total number of days worked, 168; I was in attendance myself eighteen days. This fire, which was on the shore of Mud pond, was undoubtedly started by some night hunters who were jacking for deer. It had been smoldering two days before I discovered it. I immediately hired a team and took the men there, and in two days had it under control, after which I left seven men on duty to watch it.

August 27, 1899. This fire was on Township 34. It was probably started, as it was close to Loon lake and at the foot of a large pine tree. Mr. T. M. Merwin reported smoke as having been seen in that direction, whereupon I sent a man there at once. He did not find any fire until the next day, and then only by accident, as it was burning in the ground

and making very little smoke. It was not over five rods from the brook; but the man worked four days in carrying water and digging before he could put it entirely out. So you can see how stubborn a fire is when it once gets a good hold in the dry muck. This was a very lucky find, for if it had ever got a-going it would have been the worst fire here. I am thankful it did not get started.

September 17, 1899. Number of acres burned, 120; part in the town of Long Lake and part in the town of Indian Lake; on Townships 35 and 34. It was caused, without doubt, by lightning. This fire was seen by the man on the Brown Carry four or five night before it was reported. It then looked like a lamp light in the night, and as there was no smoke observed in the daytime, the men supposed it was a camping party. On August 28th it was reported to J. G. Thompson, the superintendent of the steamboat line, who immediately sent men there to investigate it. They found at that time that it had just commenced spreading and had burned only a few rods along the trail leading to the Sargent ponds. It was reported to me Monday night, and on Tuesday I had a gang of men working at it. The dry weather and heavy winds were against us; but we had it under control in a few days. I left some men there on watch until September 23d. This fire killed everything in its course; but a large portion of the land was nothing but bushes, the ground having been burned over before.

Mr. David E. Call, town of Lake Pleasant, Hamilton county, N. Y.:

August 6, 1899. A small fire of two acres, on Township 9, Totten & Crossfield's Purchase, which we extinguished by ditching, chopping and carrying water. Ordered out eight men. The fire was probably caused by a hunting party. It was on the shore of a small lake called Upper Pine lake, about one and a half miles east of the fire described in paper marked B. On August 9th I was called away from home on business; but before leaving I arranged with Mr. O. S. Griffing, a justice of the peace in this town, to look after the fires then burning and any new ones that might occur during my absence. Mr. Griffing, together with the supervisor of the town, Mr. Edgar Call, attended to them until I returned. The fire on August 16th, on Lot 120, Oxbow Tract, and 158, Moose River Tract, did not injure any timber, as the land had been burned over before, and was covered mostly with brier patches and small brush.

August 20, 1899. Number of acres, 125; loss on timber, $175. Thirty men were ordered out, who worked in all 148 days. This fire was caused by a party of campers who left their camp fire burning. It ran over ground that had been previously burned to a large extent, mostly on Lot 20, Oxbow Tract. Most of the timber destroyed was on Lot 158, Moose River Tract, and Lot 7, Jones' Gore. The large amount of labor performed at this fire was necessary, in order to keep it from running, more particularly in an easterly direction, where it would have reached the village of Lake Pleasant. The hotels and summer residences at that place would have been in great danger if it ran over the next mountain.

September 6, 1899. Discovered a fire up the Kunjamuck valley; took six men, tools and provisions, and immediately started to locate it and put it out. We found it on the west end of Pine mountain, in an almost inaccessible place, burning very fiercely, trees and loose boulders constantly falling. We could do nothing until it had burned down the hill to the hardwood timber, where a trench was dug.

Mr. Fred N. Kirch, town of Morehouse, Hamilton county, N. Y.:

September 12, 1899. About half an acre burned over on the shore of Fourth lake, Fulton Chain; land owned by E. J. Reddington. It killed about $30 worth of timber. It started from the camp fire of H. D. Kendall, which burned his tent, as well as the surrounding timber. I called out forty men, but part of them, who were guests at the neighboring hotels, declined to receive any pay.

I am not the firewarden of this town, but was appointed a district firewarden temporarily by Colonel Fox, the Superintendent of Forests, when he came up here to attend to the fire on Black mountain.

Mr. T. D. Brown, town of Wells, Hamilton county, N. Y.:

September 6, 1899. About eighty acres were burned over, destroying timber to the extent of $320. I ordered out twelve men, who worked ten days each — one hundred and wenty days in all — not including eighteen days during which I was in attendance myself. The rain has deadened the fire so much that I think it is safe now to leave it with one man on watch along the trenches to see that the fire does not cross or burrow underneath them.

Mr. Corey Garlock, town of Russia, Herkimer county, N. Y.:

August 31, 1899. The fire in the muck extended over a half acre or so, on Lot 25, Walker Tract. I put it out with the assistance of one man, It was started along the road by some hunters who were cooking dinner, and went away without putting out their coffee fire.

Mr. William C. Perkins, town of Salisbury, Herkimer county, N. Y.:

August 18, 1899. Number of acres, 15; damage to timber, $5. Location, Lot 104, Royal Grant. There being no water near by, we used brush to whip it out and a horse to plow a furrow around the fire. This piece of land was cleared up some time ago, after which it grew up with bushes and briers. It is an old pasture in which the fire caught some way; but it had to be put out immediately or it would have run into the timber, where it would have done lots of damage.

August 29, 1899. About thirty acres burned over, destroying $50 worth of standing timber. I ordered out thirty-seven men and three horses. It is almost impossible to put fire out now, as it is so dry. We have watched it day and night, but we are getting a little rain to-day, and I think there will be no more trouble with this fire. I discharged all the men this afternoon.

Mr. John H. Bintz, town of New Bremen, Lewis county, N. Y.:

August 21, 1899. This fire, which was in the town of Webb, Herkimer county, burned over only an acre and a half; but as it was in Watson's East Triangle, near the line of my town, there was no one else to look after it. Taking twenty men in the forenoon, I went over there and extinguished it. I worked the whole twenty during the forenoon, but in the afternoon I retained only five. This land was cut over, and the logs and pulpwood were skidded. All the timber left standing consisted of a few balsams, which are of no value. The fire was on Lot 19, the property of the Carthage Lumber Company, and was only a half mile west of the State forest.

August 29, 1899. Another fire, burning over about three acres on the Carthage Lumber Company's land, in the town of Webb. I saw it just as it started, and, taking advantage of it, stopped it right off. I left two men on watch.

Mr. John M. Richard, town of Wilmurt, Herkimer county, N. Y.

August 16, 1899. Number of acres, 125; damage to timber, estimated at $25. There was nothing but old burnings, on which there were a few hardwood trees and bits of brush of hardly any value. This fire was in the town of Russia. I received a telegram from William F. Fox, Superintendent of Forests, saying: "Big fire east of Forestport. Warn out plenty of men and put it out." I took four men with me, as I did not know that I would be able to get any in that vicinity. I did not know the exact location of the fire, and there are several miles on the west line of my town where there is no one living. I found that this fire was northwest of Northwood; but it was being fought by Cory Garlock and his deputies, who had it under control. You will receive a report from Garlock.

August 21, 1899. Number of acres, thirty. There was no good timber or poplar on this ground, but there was about $20 worth of logs and cordwood destroyed. I cut brush and cleared out all rubbish ahead of the fire for a space of twenty feet wide, and then backed fire. Had three men with me, whom I had warned out. To all appearance this fire was set on purpose. I was on the road going home from the fire at Forestport when I saw smoke and drove to it. I found it burning in two places, about forty rods apart, and if I had not happened along just then they would have had trouble, as the whole lot has been recently lumbered, leaving an immense amount of spruce brush on the ground. But there was no wind to speak of, and the fire ran so slowly that I had no trouble in clearing away in front of it. It ran slowly, but burned terrifically in places, the flames reaching to the tops of the trees, compelling us to work several rods in advance on account of the heat.

August 24, 1899. Number of acres, fifteen; timber destroyed, estimated at $75. Location, lots 7 and 21, in Township 2, Moose River Tract. No State land. This fire occurred on the lands of the Adirondack League Club, and was fought by their men. I received a report from them, made by Judge Higley.

September 6, 1899. A small fire of about one-half acre, on Lot 24 of Vrooman patent. Ordered out eleven men. I saw the fire from my place and hurried there immediately. I found it on the bank of a stream — Four Mile creek. It had spread to a pile of pulpwood containing about twenty cords. There is a log camp half a mile from the place, where I got help to put it out. We had to take the wood down to save it, as the pile was all on fire. The muck was also burning, and so we had to carry water all one forenoon. I think this fire must have been caused by hunters, as I saw four men on the stream, some one of whom no doubt threw away a lighted cigar or knocked the ashes out of a pipe. It started on the bank of a creek.

September 19, 1899. Number of acres, two; timber destroyed, $20. Location, State lot 105, Nobleboro patent. George Potter, who is the district firewarden in that locality, reported this fire to me. It burned in the muck so as to destroy all the timber, which stood in as fine a piece of spruce as there is in the woods. There is still another report to be made from the manager of the Adirondack League Club of a fire on Township 3, Moose River tract.

September 25, 1899. Firewarden Richard writes as follows: Inclosed find account for services in fighting fire, by order of Col. W. F. Fox, Superintendent of Forests. The item of expense may not seem correct, as the law allows a firewarden $2.50 a day and the laborers $2.00 per day. But I had to get a team and drive ten miles to the first fire, which we fought and got under control. We then heard there was a large fire farther on towards Forestport. I sent three men home and then drove there, where I found that the supervisor, Ed. Curran, had it under control, or nearly so. There was no firewarden there, and so we kept men out on watch all night, so as not to have anybody start one somewhere else in the vicinity. It seems to me that the expense ought to be allowed, as we made no charge for the team from there, but went and put out the fire on Lot .12, Remsenburg patent, which I think was purposely set on fire, as the flames started up in two places along an old wagon road at about the same time when I came along.

It was very lucky that I was over there, as it occurred in the forest where the pulpwood had been cut, leaving an immense amount of tops and brush. Part of this lot is State land, but the fire was on the part claimed by Gideon Farr. I really think that ———— set it on fire but cannot prove it. I drove to his place and called for him, but he was out picking berries. Shortly after he came in, and then in less than half an hour I saw the smoke in the direction he came from, about half a mile away. I had just come from there, and on returning found two fires had been started along the road. We have been very fortunate in our town, Wilmurt, as so much land here has been cut over recently that a fire would burn rapidly. I put out several before they got fairly started.

Henry B. Linstruth, town of Croghan, Lewis county, N. Y.:

May 7, 1899. Number of acres, ten; loss in timber, nothing. Location, Great Lot 5, Range 11, Macomb's Purchase. Ordered out twenty-two men, who worked one day each. I think this fire was started by fishermen at Twin pond. Some of the standing timber was partially damaged, but the owner of the lot, Joseph Farney, said that he was going to cut the same for pulpwood and sawlogs as soon as the fire was checked. I left two men on watch, and on the 13th they reported to me that the fire was all extinguished.

July 10, 1899. Number of acres, 800; loss in standing timber, $800; in addition, fifty cords of stove wood were burned. One hundred days labor expended in fighting these fires, which were caused by farmers who were burning brush on their own lands. Adolph Pate and Isadore Pate came into court and paid their fine of $50 each. Charles Fritsch and Joseph Pitzoldt plead guilty to the charge of carelessness in the use of fire, and will pay their fines in a few days. As soon as they are paid I will forward the money.

August 1, 1899. Christian Yansey of this town reports that the fire at Jerdan Falls, August 1st, which burned over 750 acres, and destroyed $500 worth of standing timber, besides occasioning a great loss in cordwood and fences, was the work of an incendiary, who is supposed to have started it through a grudge which he held against the owner of the premises.

August 6, 1899. Number of acres, 1,600; value of standing timber destroyed, $500; value of logs, bark and cordwood destroyed, $150; fences and buildings, $375. I ordered out thirty-five men, whose aggregate labor amounted to 350 days. These fires were started by people burning brush on their own lands, one of whom, Fred Sauer, was arrested by me and taken before a justice of the peace, where he plead guilty and paid a fine of $50 and costs.

A SMOKY TIME.

Surface or "ground" fires often create a large volume of smoke without doing any serious damage; but if they are not checked the trees are soon killed.

There are a number of others that allow fire to escape from their own lands during this dry time, whose cases have not been settled yet. I shall attend to them in a few days if they do not settle soon. Most of these fires ran over old slashings on which there was very little loss.

August 16, 1899. Number of acres burned, 125; maple trees destroyed to the value of $50. This fire was started by George S. Campeney, and I entered a complaint against him before a justice of the peace in this town. A warrant was issued, and Campeney, having been arrested, was tried by a jury, which acquitted him on the ground of insufficient proof. No one could swear that he saw Campeney set this fire on his own land; but he did set fire on his place, which spread onto his neighbor's ground along the State road.

Mr. H. J. Boswell, town of Diana, Lewis county, N. Y.:

July 1, 1899. Number of acres burned over, 4,250; value of standing timber destroyed estimated at $8,500; number of men ordered out, 72; total number of days labor, 349. I am uncertain as to the exact number of days, as I have not had time to go over the whole town, and in some places I had to leave the district firewardens in charge. Am unable also to report the fires separately, as we were entirely surrounded by them. We thought at one time the whole township would burn, and it certainly would had it not been for the heavy rains commencing September 18th. This was the first rain we had all summer to amount to anything.

Mr. Duane Norton, town of Greig, Lewis county, N. Y.:

April 28, 1899. Number of acres burned over, 4,250; value of standing timber destroyed, $3,500. Location, Brantingham tract. Number of men called out, 50; total number of days labor, 112¾. These fires were started by farmers who were clearing land and allowed them to spread. One of them was Henry Kennedy, on Lot 8, and another was Raymond Snyder, on Lot 26. The most of this land had been burned over in 1896, and hence was not of much value. A large amount of heavy burned timber was lying on the ground, which made it almost impossible to stop the fire in the old burning. The most of our labor was used in preventing it from running on new territory. We succeeded in keeping it from doing very much damage to green timber, as you will see by my estimate.

August 7, 1899. Number of acres, eighty; standing timber destroyed, $75; total number of days labor in fighting fire, eighteen and three-quarter days. This fire was reported to have been started by John Murtaugh, who was burning brush on his lands and allowed the fire to escape beyond his premises. Several men will swear that Murtaugh is the guilty party.

There is no use in prosecuting any more men for violation of the fire law and fine them only $25. Make the penalty at least $100.

Mr. Thomas B. Fowler, town of Lowville, Lewis county, N. Y.:

August 15, 1899. Number of acres, 950; loss in standing timber, $1,900. About 250 tons of hay in stacks, valued at $7 per ton, were also destroyed. Wages for men and teams, $88.90. Two miles of fence were destroyed and 80 cords of pulpwood.

Mr. Edmond Burdick, town of Lyonsdale, Lewis county, N. Y.:

August 1, 1899. Number of acres, 700; standing timber destroyed, $950. Measures employed to check and extinguish fire by removing the combustible material in front of the flames and covering the advancing fire with dirt, using shovels, etc. This fire started in Oneida county and was fought under the direction of District Firewarden William D. Charbaneau, as I appointed him in place of James Cummings, because Cummings did not attend to his duty and this fire got a big start.

This has been the worst year for fire I ever saw. It seemed as though the whole world was burning up sometimes. The fires burned over a large area of land because it was so dry; and while men were fighting one fire another one would start up and burn over a large territory before it was discovered, because the smoke was so thick sometimes we could not see ten rods.

September 11, 1899. Number of acres, 260; standing timber destroyed, $200, all second growth. Location, Brantingham tract. This fire was fought by District Firewarden Benedict. He is a good man and attends to business all right. He checked the fire by fighting it along the roads.

September 14, 1899. About eight acres burned over on Lot 298, Brantingham Tract. No State land. This fire burned the muck and ground a foot deep. It started in a brier patch, and was stopped before it got into the standing timber. I think it was started by some careless hunter.

Mr. Charles Corbett, town of Osceola, Lewis county, N. Y.:

August 18, 1899. This fire was started by Albert Williams, who was clearing land and using fire without any notice to me or to his neighbors. The fire spread to the farm of Thomas M. Smith, where it did considerable damage. This fire has caused a good deal of hard feelings toward me, and I hope you will investigate the matter. I visited Mr. Smith on the 20th, when he told me that if the fire was not put out immediately that he would put it in the hands of his lawyer, and asked me to tell Mr. Williams just what he said.

I saw Mr. Williams' son as I passed the house and told him to ask his father to send someone to keep the fire from spreading, as I found there was hard feelings about it and I came in for a share of it. It looks as if Mr. Williams was carrying out his threat that when he got ready to start his fire he would do so without giving notice to me or his neighbors. I will give you the name of our supervisor for the last two years. It is Mr. Seth Bullock; so if you wish to find out what my pay has been you can do so, as I am accused of making money out of this fire business.

September 18, 1899. This fire was started by M. Maloney burning up a dead cow. He supposed the fire had all gone out, but it started again.

Mr. L. S. Ives, town of Turin, Lewis county, N. Y., writes as follows under date of December 28, 1899:

As supervisor of the town and firewarden *ex-officio*, I was notified August 25th that fire was raging in the woods of A. J. Failing. On going there I found that some eight or ten acres were quite heavily timbered with spruce, hemlock and hardwood. I employed men to draw water with their teams and fight the fire wherever it appeared; but it burrowed in

the ground and burned the roots of the trees, so that it was hard to control it. It required constant watching. I cleared out a swale to keep it off, which kept it back for ten days; but high winds prevailed and the trees finally fell across the swale, so that it was not extinguished until September 24th, when we had heavy rains.

There were some three or four acres burned over, but by watching the fire whenever it came to the surface and trees fell, we kept it under control. The loss on timber will be small, not over $25, I think. About $25 worth of wood was destroyed, and $20 worth of fences.

Mr. Stephen Waldron, town of Watson, Lewis county, N. Y.:

June 25, 1899. Number of acres burned, two; standing timber destroyed, $20. This fire was caused by lightning, which struck a pine stub and set it on fire. The accompanying rain was not sufficient to extinguish it. It occurred on lot 195, Watson's West Triangle.

Mr. Emory P. Gale, town of Hopkinton, St. Lawrence county, N. Y.:

August 10, 1899. Several fires burning at the same time. The one on section 21 was caused by hunters; the one on the Gale farm was caused by parties playing golf, some one of whom threw away a lighted cigar stub.

August 15, 1899. Number of acres, twenty; location, Oakham township. The timber on this land was all cut last winter, but the fire destroyed about $20 worth of hardwood, some lumber camps and sleds. Ordered out ten men; number of days worked, forty-eight. Two men were seen making a fire at these camps to cook their tea, and in about twenty minutes the smoke was seen. These men were hunters who were too lawless to put out their camp fire. The Sherman Lumber Company, of Potsdam, who own these camps, obtained the names of the men, with the intention of making an example of them for their carelessness. Everything was very dry; never known to be so dry before.

Mr. A. C. Farr, town of DeKalb, St. Lawrence county, N. Y.:

August 20, 1899. Number of acres, thirty; standing timber destroyed, $150; fences, $35. Called out twenty-one men and two teams; total number of days worked, thirty-two and three-fourths. Caught from locomotive sparks on R., W. & O. railroad. As I understand the law, the railroad company is responsible for all damage and also for all expense incurred in fighting fire. We extinguished it by plowing and backfiring, after which we drew water in order to put it out completely. We had it out once, as we thought, but considerable fire still remained in the ground. It broke out twice; but as I had men on the watch it did not do any damage.

August 24, 1899. Number of acres, 125; standing timber destroyed, $250; fences, $30. Called out twenty-seven men; ninety-four days labor; two and one-half days team work. This fire was started by Matthew Creighton, who was burning brush in order to clear land. Some fire hung in the duff, and I had to keep men watching it from September 4th to September 20th, putting on extra men when the wind was high. On September 1st a slight rain fell, but by the 4th it was as dry as ever, and the ground commenced to smoke again.

September 16, 1899. This fire was started by a hunter, who made a fire in a hollow tree to smoke out a coon. We soon extinguished it by whipping out the blaze and drawing water.

Mr. Horace Webb, town of Edwards, St. Lawrence county, N. Y.:

August 15, 1899. Number of acres burned over, 1,600; standing timber destroyed, $400; also twenty cords of wood and one barn. Warned out twenty-three men; one hundred and forty-seven days. This fire would smolder for a few days and then start up whenever there was any wind. There was so much underbrush and old slash that it was impossible to extinguish it completely, even when the wind was quiet. It was mostly in territory that had already been lumbered, and on which the timber was not very valuable. The soil was so dry, however, that the fire burned through the ground to the rock, ruining the land for a further growth of timber or any other purpose.

Mr. W. T. Clark, town of Fowler, St. Lawrence county, N. Y.:

August 13, 1899. Number of acres, 1,500; standing timber destroyed, $750. I herewith make the following report, and inclose bills for fighting fire, paid by the town of Fowler, as required by article XII, sections 277 and 278 of the Fisheries, Game and Forest Law. The first notice that I received of forest fires in the town of Fowler was on Sunday, August 13, 1899. The fire at that time was at Rice's, in the south end of the town. I immediately took charge of the work and ordered out help, as it covered a large territory. You will see by the St. Lawrence county map that this locality borders on the Lewis county line and the Pitcairn town line. In fact, none of the fires that caused this large expense started in the town of Fowler. There were large fires in the town of Diana, Lewis county, from which a heavy south wind swept the flames into my district. With a fire extending along a front of two or three miles, in an extremely dry time and heavy winds, and part of the country nothing but a slash, it was simply impossible to stop it until it came to a clearing or an open space. There was no water near, and if there had been it would not have been of any particular good while the fire was at its work. As the flames approached the clearings, fences were torn down and furrows plowed, and, in some cases, backfires were started, which proved to be of great benefit. In one place the fire was stopped in the bottom of a dried-up creek, by shoveling dirt and covering up the flames. This was done also at times in the woods, with good results. After its progress was finally checked, by plowing furrows or trenches which we dug around it, we found that the ground was so dry that the fire burrowed in it a long distance, making it necessary to keep men at work and on watch night and day to prevent it from spreading, and to be on the lookout for any new fire caused by sparks blowing across the trenches. It is difficult to make any estimate of the damage done by these fires. Nearly 2,000 acres of land were burned over, and more than 100 cords of stove wood and pulpwood consumed. Several hundred acres of fairly good timber land were burned over also. This timber is not spoiled, but most of the trees are fallen. It will have to be lumbered this winter in order to save it.

The expense of getting it off is much greater than it would be if the trees were standing. I estimate the damage to the timber, and loss in pulpwood and stove wood, together with the injury to the lands and fences, to be not less than $750. Of course the individual owners of the land estimate their loss at a much greater sum.

Mr. A. O. Morgan, town of Hermon, St. Lawrence county, N. Y.:

August 17, 1899. Number of acres, 400; standing timber destroyed, $75; timber mostly second growth and not of much value. In addition, a house valued at $250 was burned; also, fences worth from $50 to $75. This fire was at the foot of Trout lake, and for half a day things looked bad. That morning the wind raised and blew down the lake. About twelve o'clock the fire caught across the outlet, and in less than two hours it ran one and a half miles. The house that was burned stood in the lot at the foot of the lake, with green brush growing all around it. The fire surrounded the house quicker than it takes to tell it. We had a hard struggle to save three other houses; but at last we got control of the fire.

August 19, 1899. Number of acres, 750; standing timber destroyed, 100; also, twenty-five cords of bark and $50 worth of fences. In fighting it we used water, shovels, hoes and axes; whipped out the flames with green boughs; near the buildings we cut down the timber and drew it away, clearing the ground and setting backfires.

This fire was on what is known as the D. S. Lynde ranche. The damage was not so very much for the territory burned over; but if it had not rained on the 22d of August I cannot tell where it would have stopped. The men who were called out did some very good work.

The teams were used to carry men and provisions to and from the fires. It was so dry in the woods that a cigar stub thrown down on the lands would cause a fire at once.

Mr. D. S. Graham, town of Pitcairn, St. Lawrence county, N. Y.:

August 10, 1899. I find it impossible to report definitely as to many things required in this blank. It would seem as if half the town is being burned over. The fires are still raging furiously and no signs of rain, nor has there being any rain for months. I think it is a mistake to pay men $2 a day to fight fire. Just so long as they get $2 there will be fires. I wish you would use your influence to cut the price one-half. There are lots of men throughout the country who will set fires as long as they can get that pay.

Mr. E. M. Lane, town of Russell, St. Lawrence county, N. Y.:

May 1, 1899. Number of acres, ten; standing timber destroyed, none. This fire was in a berry slash on the west side of the old Albany road. On the opposite side of the road are a lot of logs and timber, and twenty cords of wood. We carried water and prevented the fire from crossing the road. Some boys were seen fishing in the brook that day, but no one seems to know who they were. I think they dropped a match, and the fire started from that, for a man saw smoke arise soon after the boys went down the creek.

There have been three or four parties who started fallow fires this spring in this part of the town without obtaining permission from me. One man forbid me putting up a fire notice on his barn, which stands on the side of the road. He said he would burn a fallow that day just the same; but he didn't.

Mr. Anson J. Larkin, town of Ballston, Saratoga county, N. Y.:

April 14, 1899. I observed this fire within a few minutes after the passage of the one-fifty-five P. M. passenger train. When I first observed it I thought it was steam from cinders and ashes which had been dropped by the locomotive. After watching it for

about fifteen minutes I noticed a blue smoke rising in the woods near the railroad, and on approaching nearer could see the blaze rising in the dry lands. I immediately employed help — Leonard Mead and John Hanks — and we extinguished it quickly, although it had got started nicely. It burned over only a few rods square.

August 17, 1899. This fire, which was upon lands of Mr. Cashman, was first observed by me about four o'clock P. M. Going there immediately, I found it was in the woods along the west side of Ballston lake. We found places in these woods where fires had been built by fishermen or campers, and, undoubtedly, this one started from one of them. Several large pine trees were burned in the ground, and stumps were blazing. We got everything secured to prevent it from spreading, after which I hired three men to watch the fire during the night for fear the wind might rise and spread it again.

Mr. A. C. Hickok, town of Corinth, Saratoga county, N. Y.:

July 1, 1899. This fire burned over about two acres before it was stopped, destroying standing timber, the value of which is estimated at $20. I think it caught from a locomotive on the branch road or switch leading from the Adirondack railroad to the International Paper Company's mill. I had two men in attendance all night and the next day. The ground was so very dry that many times we thought we had it out, when the wind would suddenly brisk up and away would go the fire over our trenches.

July 27, 1899. Number of acres, fifteen; damage, $10. In addition, a piece of fence along the road was burned. The fire was started by a locomotive. During this dry spell we have had several small fires. There is a stretch of about two miles along the railroad where nearly all railroad fires in this town occur. There is a grove there with a heavy grade, which causes the locomotives to emit sparks. If the railroad company would keep a man through the dry season to patrol this piece of road after every train, he could easily stop the fires before they reached adjoining lands.

July 30, 1899. In fighting this fire, water, in barrels, was drawn by teams nearly a mile; I found that was the only remedy. The ground is so terribly dry that in some places the fire burns down into the earth eighteen or twenty inches. This fire ran over the meadows, as well as the woods, burning hay to the value of $20.

Mr. E. J. Wilcox, town of Hadley, Saratoga county, N. Y.:

April 29, 1899. Number of acres, one hundred and twenty-five. Standing timber destroyed, $175; fences burned, $150. On this land there was about ten acres of timber, consisting of small maples, through which the fire ran rapidly. Some people think the trees are not killed, but my opinion is that they are dead. The balance of the one hundred and twenty-five acres is pasture and meadow land. A large hay barn was saved only by the heroic efforts of the men.

July 13, 1899. This fire, which burned over about four acres, started in a pasture about one mile from the Hudson river. There were some scrub pines, and a good many old pine stumps in this field. These old pine stumps burned down in the earth to the end of their roots. Owing to the long-continued dry weather the roots held fire for several days. We could not get this fire entirely out until Saturday night, the 15th, when rain came and extinguished it.

Mr. E. H. Sturtevant, town of Fort Ann, Washington county, N. Y.:

August 6, 1899. Number of acres burned over, six hundred. Standing timber destroyed, $80. Location, Buck mountain, Lake George. The timber burned was of small growth and inaccessible. On Wednesday, the 2d, a young man by the name of Benton from our town was on the west side of Lake George, from where he saw lightning strike on Buck mountain and set fire to a stump; but as it was raining at the time he supposed it was extinguished. On Sunday, the 6th, Mr. Gyler of Andrews' camp saw a party of campers go up the mountain and start a fire to cook a chowder, after which they came away leaving this cooking fire burning. The same day Mr. Brown of the Hundred Island House went up and put it out. He felt sure that he had extinguished it. It broke out again, and by Tuesday morning it was raging; whereupon a party of ten men left the Hundred Island House in a steamer and went to the fire. I went there also with ten men from Haytown's school house. That night I went for men, and on Wednesday morning got a gang of seven from Wiggins' ore bed, and sent them to the fire. I saw the smoke of this fire seventeen miles away and got there Tuesday morning. We had it under control Wednesday, and on Thursday the rain came.

The proprietor of the Hundred Island House, who sent all his help to fight this fire, makes no charge for their services, nor for the use of the little steamer which carried them down the lake.

August 28, 1899. This fire burned over about a half acre. I found it burning in the camp on the shore of the pond. Three men were fishing at the north end. I waited until they came in and then asked their names. Two of them gave me counterfeit names, but they promised to put out the fire.

Mr. G. M. Swan, town of Chester, Warren county, N. Y.:

August 7, 1899. This fire occurred on the farm of Cornelius Murphy, about two and one-half miles from Chester village. All pasture and meadow. Some city children were seen on the place picking berries that day, and it is claimed that they started the fire.

August 28, 1899. The fire, which burned over one acre, was started by lightning, as claimed by some. No one saw the lightning, but a tree that stood near where the fire started was shattered.

Mr. James A. Balcom, town of Hague, Warren county, N. Y.:

August 11, 1899. Number of acres, five hundred and seventy-five; standing timber destroyed, $800. Twenty-three men ordered out by District Firewarden Edmund West. Total number of days work, eighty-four and six-tenths. This is the same fire that District Firewarden Potter fought, Mr. Potter working on the south and east side, while Mr. West was on the north and west side. The fire originated in the town of Horicon, and I hear that it was the work of an incendiary. In my judgment nothing near a correct estimate of the value of the standing timber destroyed can be given until next summer when the trees are in leaf.

August 18, 1899. Number of acres burned, fifteen. This fire was located in a spruce thicket (small spruce), and I don't think any person competent to say how much of said small spruce is killed with the fire. Any estimate at this time would be mere guess work.

Mr. Clayton Ormsby, town of Horicon, Warren county, N. Y.:

August 6, 1899. Number of acres, six hundred; standing timber destroyed, $500; one barn and twenty tons of hay were also burned. Ordered out thirty-one men; total number of days worked, one hundred and fifty-one. A gang of men by day and another gang by night, varying in number according to the activity of the fire, confined it to the east side of Lily Pond brook by clearing away refuse and carrying water. The brook was dry except in a few isolated spots. We also dug trenches and backfired.

It was first observed August 6th when it was supposed to be nothing but a brush fire near Grassville. It seemed to die out; but on August 16th it suddenly developed widely into a strong and almost uncontrollable fire. We then had no firewarden in the town of Horicon. Mr. Richard P. Smith, justice of the peace, authorized Abel Crook, Esq., and some cottage residents at Brant lake to organize a force to fight this fire. I took charge of the men and Mr. Crook advanced $302 to pay them. All the property fronting on Brant lake to the value of many thousands of dollars was saved.

Mr. William Merrill, town of Johnsburgh, Warren county, N. Y.:

April 28, 1899. Number of acres burned, ten; value of standing timber destroyed, estimated as nothing. This fire was set by Taylor Ross to burn the old grass off from his beaver meadow. The grass was not cut last year, and so it made a hot fire; but it did not travel beyond Ross' farm. When I asked Ross' hired man who set the fire he told me readily that he and Ross did it. They carried the idea that they had the right to start fires if they kept them on their own land. I explained the law to them and left a fire notice with them.

May 5, 1899. Henry Morehouse set fire to some log heaps in a potato field, burning over a half acre. This old man did not know it was against the law to set fires on his own land during the close season; but he promised that he would not light any more.

May 9, 1899. A small fire ran over three acres on lot 25, township 11. I will subpœna witnesses to find out the cause and will send affidavits immediately to the Forest Commission.

May 12, 1899. Fire ran over five acres, doing no damage to timber, but destroyed $5 worth of fence. On the night of the 11th a tramp came to Jason Mead's house and wanted to stay all night, but was refused lodging. Then he wanted to sleep in the barn or on the piazza, but was refused. He then said he would have to sleep in the woods. Mead's folks saw a little fire, but in the morning it had gone out apparently. Afterwards it started up again. I have no doubt but these are the facts, as Mr. Mead and his wife and the hired man tell the same story.

May 31, 1899. Small fire on land owned by Joe Dalaba. Seeing the smoke I immediately went there and found Dalaba and his son setting fire to some brush heaps. I asked them if they did not know it was against the law to start fires at this time of the year. Said they did not. I told them that there was a fire notice on the school house door and that I knew they were not ignorant of the law.

June 20, 1899. This fire was on the Siamese ponds and was started by some fishermen who made an insect smudge. I put it out before any damage was done.

June 27, 1899. This fire was set by a fishing party from Maxim's hotel, but I have no proof of it. Smudges were made several places along the brook. This fire burned over

TRENCHING A FOREST FIRE.

Trenches are dug to stop the progress of underground fires. The men dig through the "duff" until sand, gravel, clay or rock is reached.

about one acre just above the dam on a spruce knoll, which made it very difficult to extinguish.

July 2, 1899. About one and one-half acres burned over, also five cords of wood were consumed. This fire, which started in a wood pile, was set by some children who were berrying in that vicinity.

July 20, 1899. Fire extinguished immediately before it burned an eighth of an acre. It was started to destroy a hornets' nest by some men who were haying.

July 31, 1899. Number of acres, forty-five. Standing timber destroyed, $300. I did not warn out any men to fight this fire, because it was started by sparks from a locomotive, and the railroad company sent the necessary men to fight it and put it out.

August 5, 1899. Number of acres, five. Timber destroyed, $20. Lightning struck a balsam tree at the head of Botheration pond, starting a fire.

August 27, 1899. Number of acres, seventy-five. Timber destroyed, $300. Fire caught from a locomotive. I notified the station agent at Riverside, and he sent twelve men, who helped to trench and extinguish it.

Mr. W. J. Hall, town of Luzerne, Warren county, N. Y.:

June 14, 1899. About five acres burned over and twenty rods of fence destroyed. Fire was started by fishermen on the creek. This was a very dangerous fire, but did no damage, as the timber and wood had all been cut off. I warned out ten men, but some of them may not put in bills for their work, as they live close by and are fighting to protect their own property.

August 30, 1899. About twenty acres burned over, but no timber destroyed. This fire started on a hill covered with blackberry bushes. There were probably fifty berry pickers in that vicinity that day. There was nothing but brush where it was burned, and I stopped it before it got into any timber.

September 4, 1899. Number of acres burned, fifteen. Standing timber destroyed, none. Lightning struck a dead pine, causing a fire, which was mostly in a bush pasture covered with sweet fern and some larger brush. It did no damage, as I kept it away from the fences and timber.

September 17, 1899. Number of acres, ten; damage, none. Fire was started by berry pickers.

Mr. William F. Woodward, town of Warrensburg, Warren county, N. Y.:

August 28, 1899. Number of acres, 125; standing timber burned, $50. I was notified that there was a fire on Ross Patent. I hired a horse at once and went there as soon as possible, ordering out all the men I could get, and commenced trenching around it. That night I got some more men to help, but the fire was on the mountain, where it was very rough, bushy and dry, with no water to be had.

September 15, 1899. Number of acres, 120; standing timber destroyed, $100. Cause not known; but the neighbors all say that George Twist burned a brush pile at the side of the road where the fire started. I was driving along the road when I discovered it about six P. M. I immediately notified J. N. Scripture to get some men and go there, and take care of it until I could go home and return. I came back in the morning at half-past five and stayed until Sunday night, when I was called to a fire in another part of the town.

The land burned over was mountain timber, hickory, oak, Norway white pine, poplar and hardwood. The woods were full of pine, poplar and birch tops, which made a hot fire while it lasted. This mountain land is steep and worthless for farming.

October 16, 1899. Number of acres, 40; timber destroyed, $10; fences, $15. This fire was caused by Charles Reardon, who was boiling potatoes near his house, and the fire escaped from his premises.

Mr. Miles Frost, town of Thurman, Warren county, N. Y.:

September 16, 1899. Number of acres, 110; standing timber destroyed, $45; location, Lot 10, Range 8, Dartmouth patent. I think this fire was started intentionally. It was on a mountain where the timber was not valuable. I live fifteen miles from where it started, and after driving over very bad roads as far as we could we had to fight it for five miles through the woods.

Mr. I. E. May, town of Davenport, Delaware county, N. Y.:

May 7, 1899. Number of acres, 602; timber destroyed, $100; fences and cordwood $25. This was the first fire since I was appointed. It was so dry that when I got on top of the hill at our place the fire traveled in both directions. The only way we could do anything to stop it was to backfire during the night.

Mr. J. A. Hill, town of Kortright, Delaware county, N. Y.:

April 30, 1899. This fire, which burned over about fifty acres, was started by some bicycle riders, it having been discovered just after they passed the place. I went there, and, finding no warden from the town of Delhi, took charge of the men. By backfiring we stopped its progress. I ask for instructions relative to securing pay for the men who worked so nobly in the heat and smoke. The fire was in the town of Delhi, but it would have been in our town in a very short time. Are not all these men entitled to pay from the town of Delhi?

Mr. Francis Bonnefond, town of Hancock, Delaware county, N. Y.:

May 8, 1899. Number of acres, 350; standing timber destroyed, $850; cordwood and bark, $60. Now, in regard to the starting of this fire: I held a court of inquiry, in which I found that Mr. David W. Stearns, Sr., and Milton H. Maynard started fires in some log heaps on Monday, May 8th, without giving notice to me. The place where the fire commenced is at the base of quite a large mountain. Both men claimed that their fires did no damage to the forest or woodlands. I want to know what steps to take in the matter, as they violated section 281 in regard to burning fallows. They both admitted to me that they started brush fires on May 8th without giving any notice to me. I inclose a statement from Mr. Stearns in regard to his fire.

Mr. Hugh Donahue, town of Olive, Ulster county, N. Y.:

April 29, 1899. Number of acres, 160; standing timber destroyed, $200. This fire was started in the town of Rochester by people who wanted to burn over the ground so as to increase the crop of huckleberries next year. Quite a number of people here make a living by picking huckleberries.

Mr. Newcomb Mapes, town of Bethel, Sullivan county, N. Y., writes under date of November 8, 1899:

I have no forest fires to report in my town for the year 1899. I superintended the burning of three fallows without accident and without employing any help at the expense of the town, which report I most respectfully submit.

Mr. Plymouth Davis, town of Rockland, Sullivan county, N. Y.:

May 5, 1899. About eight acres burned over, I should think, destroying $40 worth of timber. This fire caught from an engine on the New York and Ontario Western railroad. I extinguished it before much damage was done. I have put out twelve fires this spring between April 24th and May 10th; but none of them did any damage to amount to much. Many of the fires came from the farmers who were burning stumps and log heaps in clearing their lands; but I kept these fires out of the woods. I keep a good lookout, and when I see any smoke I start for the place and attend to it at once, so as to keep it out of the woods.

Such, in brief, is the story of the great fires of 1899, as told from my own observation and the condensed report of some of the firewardens. It is hoped that many years will pass before the like is seen again. It may be reasonably expected, also, that with the more thorough organization of the firewardens, now in progress, better results will be obtained even if the same unfavorable weather conditions should again occur.

It will be noticed in examining the tabulated returns of forest fires that certain counties only are included — the sixteen counties in which are located the lands of the forest preserve. In all other counties throughout the State the supervisors act, *ex-officio*, as town firewardens, the Commission having no power of appointment. Hence, the work of the department has been confined to the thickly wooded districts, nearly all of which are included in the sixteen counties named in the Forestry Law.

Still, there are tracts of forest land in some parts of the State that are not included in the Adirondack or Catskill counties, and in which woodland fires of considerable extent happened during the year. This was notably the case in some of the Long Island towns; also in Dutchess, Steuben and Erie counties.

The forest fires on Long Island, which have been so frequent and destructive for many years, seem to be due to a lack of organized effort to prevent them. If the Forestry Law could be amended so as to give the Commission some powers in the matter, the yearly destruction of the woods in that part of the State might be lessened materially.

The State Forestry Law, as originally enacted in 1885, provided that the Commission should "have charge of the public interests of the State with regard to

forestry, *and especially with reference to forest fires in every part of the State.*" Someone, for no apparent reason, amended the law by striking out the latter clause. The present law, in defining the duties of the Commission (Sec. 155, chap. 20, Laws of 1900), invests it with various powers, one of which is "the enforcement of laws for the protection of the forests." This seems inadequate to the case in question, for the sections defining the duties of the chief firewarden and town firewardens specifically limit their powers to towns in the sixteen counties.

The annual statistics as to forest fires, published by the Commission, would be much more valuable and interesting if they included returns from every town in the State, the reports from outside the sixteen counties to be made by the supervisors.

All of which is respectfully submitted.

WILLIAM F. FOX,
Superintendent of Forests.

DENUDED BY FIRE.

Insects Injurious to Elm Trees.

By E. P. FELT, D. Sc., STATE ENTOMOLOGIST.

NEW YORK STATE MUSEUM.

UNIVERSITY OF THE STATE OF NEW YORK.

THE number of insects attacking one tree or a closely related group of trees is so great, that it is practically impossible to notice all such forms in a brief paper, consequently this account will be limited, like its predecessor on insects affecting maples, to a few of the more injurious species. Some of those mentioned in the previous report injure elms most seriously and in a similar way a number of insects treated of in this are very injurious to maple trees. These two papers are in a degree supplementary to each other, though independent.

Methods of controlling insect pests. The habits of injurious insects are so diverse, that it may be well at this time to consider briefly a few principles of general application before treating of certain species. Practical considerations compel the recognition of two classes of insects, the biting or devouring and the sucking species. Generally speaking, the former can be controlled by spraying infested plants with arsenate of lead, paris green, london purple or other arsenical poisons. The aim of such treatment is to cover the plant so thoroughly with the substances used that it will be practically impossible for the pest to feed without also consuming the deadly insecticide. Experiments have shown more than once that caterpillars will not feed on foliage sprayed with poison till forced to do so by hunger, while those placed on untreated leaves, with all other conditions the same, manifest no such hesitancy. Thus it is pretty safe to assume that insects will not eat poisoned leaves unless obliged to do so or go hungry, and that only the most thorough spraying will produce satisfactory results. Measures of value against leaf devourers may not have the slightest effect on those forms which obtain their nourishment by sucking, through a slender beak, the fluids from the underlying plant tissues. The work of biting insects is characterized by the removal of more or less tissue from the part attacked, while sucking insects never do this, though they frequently cause wilting and discoloring in the immediate vicinity of the injury. Particles of paris green or

other such poison lying on the surface of the plant will not affect these sucking insects and as it is practically impossible to so change the vegetable fluids that an insect will not or can not feed upon them and yet not to damage the plant, we must depend to a great extent on contact insecticides in fighting these pests. The most satisfactory method of killing such insects as aphids or plant lice, scale insects, etc., is spraying them with kerosene emulsion, whale oil soap solution or similar substances. These applications must be made directly to the insects themselves and the effectiveness of the treatment will be proportional to the number of the insects hit. In short, when fighting leaf devouring insects, aim to cover the portions of the plant liable to attack with some arsenical poison, while in controlling sucking forms, it is essential to throw upon the insects themselves a substance which will kill by contact.

The foregoing are general directions subject to many modifications. Some insects are very resistant to poisons and require large doses before succumbing, but as a rule the trouble is more apt to be lack of thoroughness in the treatment than weakness of the insecticide. Many biting insects like leaf miners, twig, bark and wood borers operate in places where it is impracticable to put the poison. Others feed underground on roots and must be fought in special ways. Sucking insects also present exceptional difficulties. Some are cased with so resistant armor that it is nearly impossible to kill them with substances that will not at the same time injure the plant. The attacks of many plant lice cause the leaves to curl so that it is very difficult to hit them with a spray. Others, like biting forms, may work beneath the surface of the soil, and are therefore nearly inaccessible. Study has shown that in the case of almost every injurious insect there is some point in its life history where it is comparatively easy to keep the pest in check. A little difference in cultural methods will sometimes accomplish much. As a general rule, the wholesale destruction of insect life by the use of deadly sprays is to be avoided. Prevention is the most successful method of anticipating insect depredations. That is, avoid, so far as possible, offering conditions favorable for the development of insects in large numbers. Suppression and control, rather than extermination, should be the aim. The latter is impossible, generally speaking, while the former is frequently our only hope.

The formulas of some of the insecticides more commonly employed are given here in order to avoid repetition later. Internal poisons like arsenate of lead, paris green, london purple and the like are for use against the insects which devour or eat away portions of a plant and are effective only when the poison can be so placed that the pest must eat it with the plant or go hungry.

Formulas for arsenical preparations. Arsenate of lead may be prepared as follows: Dissolve 11 ounces of acetate of lead (sugar of lead) in four quarts of water and four ounces of arsenate of soda (50% purity) in two quarts of water, each lot in a wooden pail, and then add the solutions to the required amount of water, which for most leaf-eating insects will be about 100 gallons. This substance can be used in much greater strength without danger of injuring the plants, provided it is properly prepared. It is of special value against the elm leaf beetle because of the adhesiveness of the poison, and for this insect it is better to use the amounts given above in but 50 or 80 gallons of water. This poison has also been placed on the market in a paste form ready for dilution with water. Thus prepared it has all the good properties of the freshly made material and may be used with confidence. The crystalline arsenate of lead can not be recommended as it is heavier and does not adhere to the foliage as well as the other form.

Paris green or london purple, and also certain other arsenical preparations, are used with great success in combating leaf feeders. One pound of either of these poisons to 100 to 150 gallons of water is the proportion usually employed. It is well to add also a pound of recently slacked lime (mix with considerable water and strain before adding) in order to lessen the danger of burning the foliage. It is essential that either of the above mixtures be kept well stirred in order to secure uniform results, as the latter named poisons, in particular, sink rapidly to the bottom of the tank.

Formulas for contact insecticides. Kerosene emulsion is one of the most important of the contact insecticides, that is, those which must be actually thrown onto the insect in order to secure results. It may be prepared as follows: Dissolve one-half pound of hard soap in a gallon of boiling water and while it is still hot add two gallons of kerosene, and emulsify either by stirring rapidly or by repeatedly forcing it through a pump and fine nozzle. A white, uniform creamy mass which does not break up into oil and water should be obtained and this can then readily be diluted with water, the usual amount being nine parts water to one of the emulsion. A sour milk emulsion should be used in limestone regions, two gallons of kerosene to one gallon of sour milk, emulsify as described above and dilute. The 10 per cent mechanical kerosene emulsion can be used in a similar manner, provided the pump can be depended upon to give reliable proportions. One pound of whale oil soap to four gallons of water can be used safely on foliage and is as effectual as the kerosene emulsion for similar purposes.

Elm Leaf Beetle.

Galerucella luteola Muller.

This imported insect is in all probability responsible for more ruined elm trees in the Hudson river valley than all other destructive agencies combined. The above is a sweeping assertion, but a careful examination of conditions in various cities and villages compels one to accept this conclusion as very close to the truth. The extensive and vigorous means employed in controlling this pest in Albany and Troy, N. Y., have mitigated the injury very materially and have demonstrated the possibility of keeping the insect under control. The results in Albany are evident to any observer, for instead of a large proportion of the elms having their leaves skeletonized and brown in midsummer, as was the rule in 1896 and 1897, the effects of the work of this pest are seen only here and there where trees have not been thoroughly sprayed or else entirely neglected. These more local injuries show that the pest is still here with unabated vigor and warrants the assumption that the improved condition of the elms is due largely to the extensive spraying operations.

Distribution. This beetle is common over a large part of Europe but it is injurious only in the southern portions of Germany and France and in Italy and Austria. It probably established itself in this country about 1834, as it was very injurious to elms in Baltimore in 1838. It is now found from Charlotte, N. C., to north of Salem, Mass., and as far west as Kentucky, at least. The progress of this insect up the Hudson river valley is interesting to follow, indicating as it does, the distribution of the beetle along the lines of travel. The pest was abundant and destructive at Newburg in 1879, 12 years later it was reported from Poughkeepsie, in 1890 from Hudson, in 1891 from New Baltimore, in 1892 it was known in Albany and Troy, in 1896 it was taken at Mechanicville, and in 1900 it was located at Schuylerville and Salem. It occurred in numbers at Hoosick Falls in 1899 and has also been taken at Oswego, Hastings and Rochester. Prof. M. H. Beckwith reports its presence in numbers at Elmira, Chemung county. The distribution of the species in this state may be given briefly as follows: The Hudson river valley north to at least Schuylerville and Salem and with several colonies in the southern and western central portion of the state. These latter are of great economic importance as they indicate that this species can exist in that section of the state and give rise to the fear that in time it may become as destructive there as it now is in the Hudson river valley. The presence of this pest in these localities should be regarded as a warning and measures should be taken by local authorities to prevent the possibility of extensive ravages.

Description. The skeletonized, brown appearance of the foliage of an infested tree in midsummer is very striking and in the Hudson river valley cities and villages this condition is quite apt to be the work of this pest, but in the western part of the state a small flea beetle, *Disonycha triangularis* Say, occasionally strips a few American elms nearly as completely and its work should not be confused with that of this imported elm insect.

The parent beetle may be recognized by the aid of the colored figures (Plate 1, figures 5, 6). This insect is about $\frac{1}{4}$ of an inch long with the head, thorax and margin of the wing covers a reddish yellow. The coal black eyes and median spot of the same color on the head are prominent. On the thorax there is a dorsal black spot of variable shape and a pair of lateral ovoid ones. The median black line of the wing covers is separated from the lateral stripes of the same color by greenish yellow. The wing covers or elytra are minutely and irregularly punctured, bear a fine pubescence and at the base of each wing cover there is an elongated black spot in the middle of the greenish yellow stripe. The markings are fairly constant in the beetle but the color is quite variable during life and changes more or less after death. Many beetles emerging from winter quarters have the conspicuous greenish yellow stripes of the wing covers nearly obliterated by black. The antennæ or feelers are golden yellow with more or less brownish markings. The legs are yellowish with the tibiæ and tarsi marked with brown. The under surface of the head and prothorax is yellowish, that of the metathorax and abdomen black.

The orange yellow eggs are usually deposited in irregular rows side by side, forming clusters of from three to 26 or more on the under surface of the leaf. Each egg is somewhat fusiform, attached vertically by its larger end, with the free extremity tapering to a paler, rounded point (Plate 1, figures 1, 1*a*). Under a powerful lens, the egg shell is seen to be finely reticulated.

The recently hatched grub is about $\frac{1}{20}$ of an inch long, with the head, thoracic shield, numerous tubercles, hairs and legs jet black. The skin is dark yellow but the tubercles are so large and the hairs so prominent that the prevailing color of the larva at this stage is nearly black. As the grub increases in size and molts, the stiff black hairs become less conspicuous and the yellow color more prominent (Plate 1, figure 2) until the last stage, which is represented at figures 3, 7, plate 1. The full grown larva is about half an inch long, more flattened than in the earlier stages, with a broad yellowish stripe dorsally and a narrower stripe of the same color on each side, the yellow stripes being separated by broad dark bands thickly set with tubercles bearing short, dark colored hairs. The dorsal yellow stripe is broken on each side by a subdorsal row of dark tubercles, which increase in size posteriorly.

The lateral yellow stripe includes a row of prominent tubercles with dark tips bearing short hairs of the same color. The under surface is yellowish.

The pupa is a bright orange yellow, about $\frac{1}{5}$ of an inch long, and with a very convex dorsal surface which bears transverse rows of stout, inconspicuous hairs (Plate 1, figure 4).

FIG. 1.— Leaf showing holes eaten by elm leaf beetle.

FIG. 2.— Work of elm leaf beetle grubs.

Life history. The transformations of this insect are so rapid that a man must know what to expect or in fighting the pest he will accomplish practically nothing, because a substance effective against the beetles or grubs may not kill the pupæ, and, after the larvæ have begun to descend the trees, may be of no value.

The winter is passed by the beetles in attics, sheds, outhouses and in other sheltered places. With the advent of warm weather in the spring, they emerge from their retreats and may be found on the walks during the sunny portion of the day or upon the windows of houses trying to escape. The last of April or early in May, with the appearance of the elm leaves, the beetles fly into the trees and eat irregular holes in the foliage (Figure 1 and plate 1, figure 9). Some time is occupied in feeding before the deposition of eggs begin, a process which may continue over four and possibly for five or six weeks. These prolific beetles consume a large amount of foliage during this time, depositing clusters of three to 26 or more eggs every

day or two. Over half the total number of eggs may be laid within about 12 days at the height of the season, which in 1898 was from June 12 to 23. One female has been known to deposit 623 eggs and it is possible that under more favorable conditions an even larger number might be produced.

The young grubs emerge from the eggs early in June, as a rule, or in about five or six days after the eggs have been deposited, later in the season. They soon begin to feed on the under surface of the leaves, producing the familiar skeletonizing shown in figure 2 and plate 1, figures 7 and 8, which is caused by their eating the softer under part, leaving the upper epidermis and the veins. The results of their feeding is so marked that it is easy to detect the presence of the grubs by the semitransparent patches in the foliage, which soon dry and turn brown.

The grubs complete their growth in from 15 to 20 days in summer (in cooler weather the time is extended), become restless, forsake the leaves and descend the limbs and trunk to a great extent, seeking a slight shelter under which to pupate. Seven days are spent in this state in warm July weather, while in September it is extended to 12 days and in October to 24. The descent of the grubs of the first brood usually occurs in Albany the last of June or early in July. Some were observed descending June 19 in 1896 and beetles of the second brood were to be found on June 30. The oviposition of the second brood of beetles may begin by the middle of July and from then till late in autumn it is possible to find all stages of the insect in some part of Albany. The beetles of the second brood are naturally attracted to fresh growths of foliage and consequently more eggs are deposited on such trees, which are most frequently those defoliated earlier in the season. Thus a tree is very apt to lose two sets of leaves in a season and may possibly have its third set badly marred by this pest. The second brood of grubs may complete their growth about the middle of August, transforming to beetles the latter part of the month, and if there be an abundant supply of fresh leaves, a third generation may be produced in considerable numbers. This last brood rarely develops on the second or third set of leaves, but is more frequently found on nearby trees which had not suffered much, earlier in the season. It may be considered the rule in Albany that a considerable second brood will appear with a possible third generation in smaller numbers. This beetle attacks European elms by preference, though frequently it is very destructive to American elms.

Natural checks. Many have thought that in the course of a few years some natural agent might reduce this grievous pest to comparatively harmless numbers. This can hardly be expected for some time, at least, because the beetle is still very injurious at Washington, D. C., where it has been for many years, and the same is

true of other localities. Many of the beetles are killed while hiding in damp places by a fungus, *Sporotrichum entomophilum* Peck. The toad must devour large numbers of the beetles if the following record be its normal habit. Pupils under the direction of Miss Clara Russell of the State Normal College, Albany, N. Y., observed one toad eat 50 elm leaf beetles within an hour. Three beetles and a fly have been recorded as attacking this pest. The spined soldier bug, *Podisus spinosus* Dallas, is a very interesting species and it may frequently be found on infested trees with an elm leaf beetle grub impaled on its extended beak. The peculiar young of the delicate lace wing flies may often be seen in the vicinity of eggs or larvæ of this pest, thus giving rise to the suspicion that occasionally this elm destroyer suffers from attack by these bloodthirsty creatures. The preying mantis, *Stagmomantis carolina* Linn., also feeds on this species in its southern range.

Points of attack. The secret of controlling an insect frequently lies in a knowledge of some vulnerable place in its life history. It is practically impossible to get at the insect while it is hibernating but, if the leaves are thoroughly sprayed with an arsenical poison early in the spring when the beetles begin to feed, many of them will be poisoned. The disinclination of this insect to fly a great distance is encouraging to the man who protects his own trees, since it reduces the liability of their flying from neglected trees near at hand. The local spread of this beetle is slow and the most should be made of it by keeping the pest in check wherever it occurs, even though the infestation be a small one and the injury at the time of little importance. It is a mistake on the part of local authorities to wait till the creature becomes destructive. It should be fought at the very beginning, even before it has secured a fair foothold in a locality.

The grubs feed almost exclusively on the under surface of the leaf, rarely occurring on its upper side. The attack usually begins on the upper, more tender leaves, hence the tops of the trees need spraying most and in order to kill the grubs, the poison must be thrown on the under side of the leaves, and, as a rule, this treatment will be found most satisfactory. The full grown larvæ crawl down the trunks in great numbers and the golden yellow pupæ may be found in abundance in crevices in the bark and on the ground about the trees. Large numbers of these insects can be killed at this time by spraying them with a contact insecticide such as kerosene emulsion, whale oil soap solution or by pouring boiling water on them. These palliative measures are advisable only when others can not be carried out and in order to secure the best results, the grubs and pupæ should be destroyed every five days so long as the pests are seen in numbers. Bands of tar, sticky fly paper, cotton batting, etc., while they do no harm, can not be considered as of much value in keeping

the elm leaf beetle under control. The relatively few grubs caught on a sticky band are but a drop in the bucket compared with the mass which complete their transformations. It is worse than useless to attempt to control this or any other insect by boring a hole in the trunk of a tree and inserting therein a compound of any nature. The tree is weakened and unless the chemical be powerful enough to kill the tree, the insects are not affected.

Bag or Basket Worm.

Thyridopteryx ephemeraeformis Haworth.

This insect is limited in this state to the southern portion of the Hudson river valley and to the islands about New York. It has been recorded as far north as Yonkers and Mt. Vernon. It is a species of considerable economic importance to us despite its limited range in the state, and in New York city and vicinity it finds ample opportunity to inflict considerable damage on valuable trees. It manifests a great liking for certain evergreens and as these are usually killed with one defoliation, there is need of watching them closely. A study of the insect shows it to be one of the most interesting forms in our native fauna.

The conspicuous larval cases or bags reveal the identity of the depredator or excite the wonder of the curious, and examples of these are received yearly, some with accounts of serious injury, and others with a query as to the nature and origin of the curious structures.

Description. The larval case or bag of this insect is usually the first to attract notice. It is a fusiform structure from an inch and a half to two and one-half inches long and in fall and winter it is firmly attached to a twig by a broad band of silk, as shown at figure 10 on plate 1. The form of the bag is quite characteristic but as this shelter is covered with particles of bark, pieces of leaves, leaf stems, etc., from the tree on which the larva feeds, its appearance may vary considerably. A female case cut open in late fall or winter presents the appearance shown at figure 11, plate 1. Within is the black pupal case and inside that there is a soft yellowish down and a large number of yellowish eggs, a few of which are shown enlarged on the same plate at figure 12. The appearance of the young larva and the cases formed a little later are exceedingly well shown at figures 13, 14 and 15 on plate 1. Special attention should be called to the harmony in color existing between the small cases and the portion of the twig upon which they occur, due, as determined by Mr

Joutel, to the larva gnawing particles from the bark to attach to its tiny case. The full grown larva removed from its protecting bag is shown at figure 16 and the creature's method of carrying its apparently cumbersome retreat is represented at figure 17. The pupal cases of the two sexes are shown at figures 18 and 21 and the wide difference between the adult insects at figures 19 and 20. The female is almost legless, wingless and nearly helpless, while the male is a small black moth with well developed wings and beautiful feathery antennæ.

Life history. The eggs survive the winter within the larval and pupal cases of the female. The young appear sometime in May or early in June and begin by eating the softer portions of the leaf. They repair to the stems when not feeding and here it is that they sometimes cover their interesting shelters by biting off pieces of the bark and attaching them to the case. This habit was brought to my

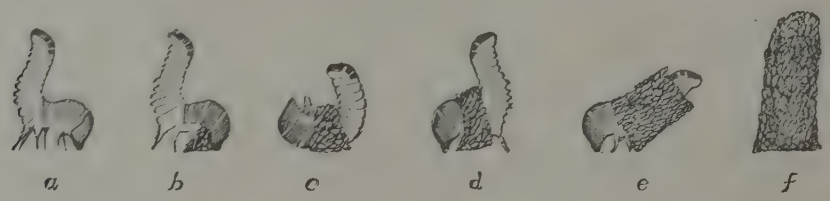


Fig. 3—Young caterpillar making its case on a leaf: *a*, position as it begins operations; *b*, beginning the case; *c*, caterpillar under strip and upside down; *d*, caterpillar after turning; *e*, case more enlarged; *f*, case complete. (After Riley, Bull. 10 U. S. Dept. Agr., Div. Ent.)

notice by Mr Joutel who, in the course of his studies of the insect, found many tiny brown cases on the older bark, green ones on the younger bark and occasionally party colored ones. The gnawed condition of the bark showed where the color had been obtained. This is not the first record of this interesting habit for the same thing was observed by Mr S. S. Rathvon in 1867. He also mentions an instance of the young larvæ of this insect hatching in his office and in the absence of food escaping to the floor where they proceeded to attach to their cases pieces of paper, leather, straw matting and even scales of lime, in fact taking anything at hand. The cases may also be constructed on the leaves. Dr Riley's exceedingly graphic account of this operation is as follows: "The way in which this bag is prepared is curious (Fig. 3). The young larva crawls on a leaf and, gnawing little bits from the surface, fastens these together with fine silk spun from its mouth. Continually adding to the mass, the larva finally produces a narrow, elongated band, which is then fastened at both ends onto the surface of the leaf by silky threads. Having secured itself from falling down by some threads, it now straddles this band and,

bending its head downward (Fig. 3 *b*), makes a dive under it, turns a complete somersault and lies on its back, held down by the band (Fig. 3 *c*). By a quick turning movement the larva regains its feet, the band now extending across its neck (Fig. 3 *d*). It then adds to the band at each end until the two ends meet, and they are then fastened together so as to form a kind of narrow collar which encircles the neck of the worm. Far from resting, it now busies itself by adding row after row to the anterior or lower end of the collar, which thus rapidly grows in girth and is pushed further and further over the maker (Fig. 3 *e*). The inside of this bag is now carefully lined with an additional layer of silk, and the larva now marches off, carrying the bag in an upright position." The case is carried in an upright position for a time but as it becomes heavier it is allowed to hang down (Plate 1, figure 17). Holes are eaten out of the leaves (Plate 1, figure 15) as the larvæ increase in size and pieces therefrom are attached to their protective covering. The cases are enlarged from time to time to meet the requirements of the growing caterpillar. The peculiar, ragged appearance produced by half grown bag worms is shown on the leaf just below figure 22, plate 1. The caterpillars attain their full size in July or August and in early September they become restless and wander to other trees and shrubs. Next the bags are securely fastened to twigs (sometimes the males attach their bags to leaves) by broad bands of silk (Plate 1, figure 10), and the caterpillars then transform to pupæ and about three weeks later assume the adult form. The males are on the wing during September and October. Their appearance is preceded by the male pupa wriggling itself partly out of the larval case, thus permitting the occupant to escape direct from his pupal case to the free air, see plate 1, figure 22. The female does not leave hers till after ovipositing but works out of her case far enough to permit pairing, returns, oviposits and then escapes from the case and dies. The posterior portion of the pupal shell, which is the upper part as it hangs, is filled with eggs, and the anterior or lower part with the yellowish downy substance which is also intermixed with the eggs to some extent. The eggs may be found the latter part of October and the winter is passed in this form, as previously stated.

Food plants. This caterpillar feeds on a number of trees and shrubs, but it is most injurious to evergreens on account of their not withstanding defoliation during the growing season. This insect is specially injurious to arbor vitæ and red cedar. It has been recorded on the following trees, beside those previously mentioned: Apple, pear, plum, cherry, choke cherry, apricot, quince, linden, catalpa, maple, locust, oak, elm, poplar, sycamore, osage orange, willow, spruce, hemlock, larch and white pine.

Distribution in the United States. This species is stated by Dr Riley to occur in

the more southern portions of the middle states and in the southern states, but it appears to be absent from the peninsula of Florida. It occurs within these limits from the Atlantic to Texas and reaches the less timbered regions west of the Missis-

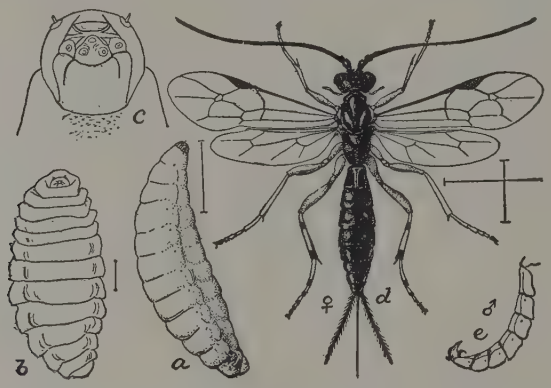


Fig. 4: PIMPLA INQUISITOR: *a*, full-grown summer larva; *b*, hibernating larva; *c*, mouth-part of larva; *d*, adult female; *e*, abdomen of male from side — all enlarged; *c*, greatly enlarged. (After Howard: U. S. Dep't agriculture, Division entomology. Tech. ser. no. 5, 1897.)

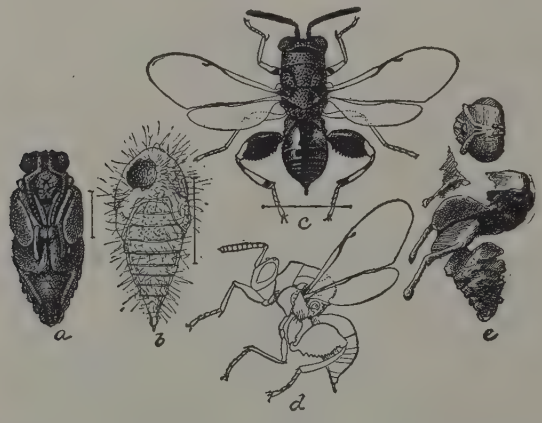


Fig. 5: CHALCIS OVATA: *a*, pupa: *b*, parasitized pupa of *Notolophus;* *c*, adult; *d*, outline of same from side; *e*, pupal exuviæ — enlarged. (After Howard: U. S. Dep't agriculture, Division entomology. Tech. ser. no. 5, 1897.)

sippi. Professor Webster has recently shown that this insect has established itself in Ohio within 25 miles of lake Erie.

Natural enemies. This species is subject to attack by several natural enemies. *Pimpla inquisitor* Say, *P. conquisitor* Say, and *Hemiteles thyridopterigis* Riley, are

among the more important ichneumon parasites. The last named is more abundant than the two preceding, and unfortunately it is probably a hyperparasite preying on the beneficial *Pimplas*. *Chalcis ovata* Say is a minute, four winged fly which was reared from this species by Dr Lintner. *Dibrachys boucheanus* Ratz., a common hyperparasite, was also reared from this insect by Dr Lintner.

Remedies. The spread of this insect is dependent almost wholly on the wandering of the larvæ, which must be very limited on account of their cumbersome load. This, in connection with the eggs being deposited in a stout, conspicuous case, which remains on the trees all winter and is easily removed, renders the control of the insect, by collecting the bags at this time and burning them, comparatively easy. This caterpillar is a leaf feeder and yields readily to arsenical poisons. Evergreens are quite susceptible to arsenic and therefore the arsenate of lead has been recommended. Dr Smith advises the use of at least 15 ounces of the arsenate to 40 gallons of water for the purpose of securing the prompt destruction of the pests.

Fall Web Worm.

Hyphantria cunea Drury.

The conspicuous webs of this caterpillar are very familiar objects the latter part of summer. They may be recognized at once by their inclosing all the leaves of a twig or branch and if these features are kept in mind there will be no danger of confounding this species with the apple tree tent caterpillar, a pest which forms webs in early spring in the crotches of the limbs and does not inclose leaves within its webs. The hairy fall web worms feed under their tent on the softer upper portions of the foliage which soon dries. The beauty of the tree is seriously marred by the unsightly nests and the brown, skeletonized foliage within them. Occasionally this insect is present in such large numbers as to devour most of the foliage, and in southern cities entire rows of trees may have their leaves destroyed by this pest.

Distribution. This insect is an American species and occurs from Canada to Georgia and certainly as far west as Montana and Texas. It appears to be more injurious in some of the southern states like Kentucky, where the development of a vigorous second generation is the rule, than it is farther north.

Description. The yellowish, globular eggs (Plate 2, figure 1) are deposited in clusters of one to three hundred, usually on the under side of the leaf. The yellow changes to a dull leaden hue, due to the developed caterpillar within, just before the eggs hatch.

Explanation of Plate 1.*

Elm Leaf Beetle (*Galerucella luteola* (Muller).

1. Cluster of eggs, much enlarged.

1*a*. Side view of single egg, still more enlarged.

2. Recently hatched larva or grub, much enlarged.

3. Full grown larva or grub, much enlarged.

4. Pupa, much enlarged.

5. Overwintered beetle, much enlarged.

6. Fresh, brightly colored beetle, much enlarged.

7. Leaf showing eating of larvæ or grubs and a few holes eaten by beetles, eggs in clusters, cast larval skins and full grown larvæ, natural size.

8. Leaf nearly skeletonized by grubs of larvæ, and on it three cast larval skins, natural size.

9. Leaf showing holes eaten by beetles, natural size,

Bag or Basket Worm (*Thyridopteryx ephemeræformis* Haworth).

10. Bag or larval case as it passes the winter, natural size.

11. Same as preceding but cut open to show the pupal case and the eggs.

12. Several eggs, very greatly enlarged.

13. Recently hatched larva, greatly enlarged.

14. Cases of young larvæ on twig, notice that the dark ones are on the dark bark and the light ones on the green bark, natural size.

14*a*. Leaf eaten by young larvæ, natural size.

15. Older larvæ in their bags which are ornamented with pieces of leaves, one is on the leaf, another hanging from the edge and a third dangling by a thread, natural size.

* Executed from nature, under the author's direction, by Mr L. H. Joutel of New York city.

L. H. Joutel, 1900

ELM LEAF BEETLE AND BAG OR BASKET WORM

James B. Lyon, State Printer

16. Full grown larva removed from its case, natural size.
17. Full grown larva walking with its case, natural size.
18. Male pupa, natural size.
19. Female moth, natural size.
20. Male moth with wings spread, natural size.
21. Female pupa, natural size.
22. Bag of male hanging from a leaf and with the empty pupal case protruding from its lower extremity, natural size. The leaf in front of the bag shows the work of half grown larvæ.

The recently emerged caterpillar has been described as pale yellow, sparsely haired, with a black head and with two rows of black marks along the body, but as there is considerable variation in the color of the larva later in life, it would not be surprising to find the same more or less true of its earlier stages. The hairy, yellowish, brown and black marked caterpillars vary considerably in appearance. A half grown and two full grown larvæ are represented on plate 2, figure 2, a dorsal and a lateral view being given of the latter two. The head is black and the whitish or brownish hairs spring in clusters from the black and orange tubercles.

The oval cocoon is thin and mixed with larval hairs or, where it is spun at or just below the surface of the ground, particles of soil may be entangled in its meshes. The brownish pupa may be recognized by the swelling near its middle (Plate 2, figures 3, 4).

The moth is very variable in appearance and ranges from a pure white to a form much spotted with black. Compare figures 5 and 6 on plate 2.

Identity of the insect. The extreme variability of the adult has led to the bestowal of a number of scientific names on the insect which in its larval state makes the conspicuous webs above described. There is even now a discussion in progress between systematists as to whether all these webs are made by the larvæ of one species or not. For the present we will call the insect so abundant in New York state the fall web worm and treat of it under the scientific name given above.

Life history. The moths fly from early in June till the middle of August, at least, occurring in large numbers in the middle of June, the early part of July and the first half of August, according to captures by Dr H. G. Dyar at Poughkeepsie, N. Y. Records kindly placed at my disposal by Prof. G. H. Hudson of the Normal School at Plattsburgh, show that moths appear in small numbers at that place from the 9th to the last of May, that they are quite abundant throughout June, being most numerous from the 8th to the 10th and from the 14th to the 30th. They were also present in small numbers throughout July, occurring in larger numbers on the 3d and 4th, and one individual was taken August 2. The caterpillars begin to be noticed the latter part of June or early in July and are most abundant in August. They were observed at Annandale, Dutchess county, June 27, 1900 and at Buffalo, Erie county, July 3 in the same year. Thus in the southern portions of the state the normal occurrence of at least a partial second brood can hardly be questioned but so far north as Plattsburgh, it would appear from the record given by Prof. Hudson that but one generation a year is usually the rule.

The eggs are deposited in clusters of several hundred on the underside of a leaf and they hatch in warm weather in from seven to ten days, the young caterpillars begin-

ning at once to spin a web under which they feed. This protecting web is extended to include more and more foliage till finally a considerable proportion of a branch may be inclosed. The caterpillars feed only on the upper portion of the leaf, where they eat the softer parenchyma. The skeletonized leaves within the nest soon dry, turn brown and they with the frass and cast skins of the caterpillars, render the nests very unsightly objects. Occasionally the caterpillars may be forced to leave their webs on account of a scanty food supply but ordinarily this does not occur till they are nearly full grown, which is usually about a month after hatching and then they wander in search of a place to undergo their final transformations. The caterpillars may spin their thin, semitransparent cocoons in crevices of the bark and in similar shelters at or below the surface of the ground. The insect usually hibernates in an underground cocoon but Prof. Garman of Kentucky has recorded an instance where the adults emerged in the fall and successfully wintered. A recently issued moth was also taken in Washington, D. C., in early January of 1890. The first generation of caterpillars are said to spin their cocoons above ground by preference.

Food habits. This caterpillar is a very general feeder as is attested by a list of 120 food plants, comprising fruit, shade and ornamental trees, that has been compiled by the Division of Entomology of the United States Department of Agriculture. The white elm, willows and poplars suffer perhaps as much as any trees in New York state, though more complaints are received of the depredations of this insect on fruit trees. This is doubtless due to the fact that the injury to the latter is more generally reported on account of the greater value of the trees.

Natural enemies. Fortunately this insect is preyed upon by a number of natural enemies. A tiny egg parasite, *Telenomus bifidus* Riley, may sometimes destroy most of the eggs in a cluster. There is a record of *Ophion glabratum* Say having been reared from this insect. *Apanteles hyphantriæ* Riley and *Limneria pallipes* Prov. are important parasites of this pest and they in turn are attacked by *Elasmus atratus* How. *Meteorus hyphantriæ* Riley is another valuable parasite of this insect. Its suspended cocoon may by recognized by the accompanying figure. The spined soldier bug, *Podisus spinosus* Dall, and the allied *Euschistus servus* Say prey on the caterpillars. The larvæ of a Carabid beetle *Plochionus timidus* Hald., have been observed in Missouri within the nests in considerable numbers feeding upon the caterpillars. *Calosoma scrutator* Fabr., dragonflies and a species of robber fly prey on the moths. The preying mantis, *Stagmomantis carolina* Linn., and the wheel bug, *Prionidus cristatus* Linn., are two forms which attack on the caterpillars in the southern states. A fungus, *Empusa grylli*, has been recorded as very destructive to this pest in Kentucky in certain years.

Remedies. The habit the caterpillars have of feeding under a large web renders it comparatively easy to cut off the infested portions of the limb and kill the pests by crushing or burning, and where the insect is present in small numbers, this is probably the most satisfactory method. This pest can also be fought by burning them with a torch while the web is still on the tree but many of the caterpillars

Fig. 6. METEORUS HYPHANTRIÆ, female and cocoon. (After Riley, Bull. 10, U. S. Dept. Agr., Div. Ent.)

may escape destruction and unless the work is very cautiously done, the fire may injure the tree seriously. Spraying with arsenical poisons about the time the caterpillars appear is also most satisfactory where apparatus for such work is at hand.

Spiny Elm Caterpillar.

Euvanessa antiopa Linn.

The depredations of this insect attract considerable attention from time to time. It is common in the butterfly form, though its connection with the spined, black, red-spotted caterpillars may not be known to many. This insect was present in great numbers in various sections of the state in 1899 when its depredations on elms led to considerable complaint. It not only feeds on elms but occasionally it is so abundant as to literally strip acres of poplars.

Description. The parent insect is a magnificent dark maroon butterfly with blue spotted, black and yellow bordered wings which have an expanse of about three inches, see plate 2, figure 11. The under surface of the wings presents a striking contrast, being a dark bluish black and brown intermixed with some yellowish gray. The

yellow border of the upper surface is represented by a brown specked gray with a little dull yellow. The color of the under surface of the wings is somewhat variable but it is remarkable for its protective value. The butterfly with its closed wings frequently appears much like a scale of loosened moss or a bit of brownish or black vegetable matter. The yellowish eight or nine ribbed eggs which soon turn reddish and finally black just before hatching are deposited in a band or a nearly complete one around a twig, as shown at figure 7 on plate 2, one egg much enlarged being represented at figure 8. This shows not only the larger ribs but the transverse markings between them. The dot beside the egg represents its natural size. The recently hatched caterpillars are brown, black and hairy and as they increase in size the other characteristics shown at figure 9 on plate 2 become more apparent. The full grown caterpillar is about two inches long, black and armed with numerous short branched spines. Along the back there is a row of somewhat diamond-shaped red spots and closer examination shows the caterpillar to be marked with transverse rows of minute white spots. The abdominal prolegs are reddish. The chrysalis is a peculiar, angular looking structure which is variable in color and in nature it usually harmonizes pretty closely with surrounding objects. It it represented at figure 10 on plate 2.

Life history. Strange though it may seem, this apparently delicate butterfly successfully withstands the rigors of our northern winters with no better shelter than that afforded by a crevice among stones, a sheltering board, a cavity in a tree or a similar place. It is one of the first butterflies to come forth in the spring, frequently appearing before the snow has entirely disappeared and occasionally it may be seen during unusually warm weather in midwinter. The over-wintered individuals are said to pair about the middle of April but eggs are not laid till the first half of May. The deposition of the eggs has been observed a number of times. They are placed in somewhat alternating rows, the female requiring about 40 minutes to deposit 300 eggs, and as many as 450 have been recorded for one cluster. The eggs require 12 to 15 days for hatching in the spring and in midsummer but nine. The caterpillars are gregarious and when young range themselves side by side with great regularity. They are more frequently found near the top of a tree and as they increase in size, defoliated branches usually give the first indication of their presence. The caterpillars are often found on a near-by partly stripped limb which frequently bends under their weight. Their habit of feeding close together makes their injuries more apparent than would otherwise be the case. The caterpillars of the first brood attain their growth in New York state the latter part of June or early July and butterflies from them may be seen ovipositing during July. The deposition of eggs was observed at Albany July 17 and nearly grown larvæ were taken the latter part of

August. Caterpillars of this insect are much more abundant in June than later, and those observed in August and September must be considered representatives of a second brood. There is possibly a third generation some years. The relative scarcity of the caterpillars later in the season may probably be explained by the increasing abundance of their natural enemies and it is by no means impossible that some butterflies of the first brood may hibernate over winter as suggested by Professor Weed.

Common names. This butterfly has received a number of common names. One widely adopted and perhaps best known in this country is the Mourning Cloak, a translation of the German Trauermantel. It has also passed under the names of Antiopa Butterfly and Willow Butterfly to a considerable extent, and the English designations of Camberwell Beauty and Grand Surprise are worthy of mention. The injurious caterpillar could easily be designated as the larva of the Mourning Cloak or whatever common name is preferred, but it is simpler for a person interested only in the practical side of the subject to use a special name for the caterpillar and therefore, following Dr C. M. Weed, I have employed the designation of Spiny Elm Caterpillar for this destructive larva.

Food plants. This insect is more frequently brought to notice on account of its depredations on the white or American elm, though it is also very injurious to willows and poplars but the small value of the latter two renders the damage of less importance. The caterpillars are also recorded as feeding on the Hackberry, *Celtis occidentalis*, and the butterfly has been observed to deposit its eggs on white and canoe birch.

Distribution. Mr Scudder in his work, *The Butterflies of New England*, states that this insect "is apparently distributed over the entire breadth of the northern hemisphere below the Arctic circle as far as the thirtieth parallel of latitude." He further states that it is found in nearly equal abundance throughout New England and flies to but does not breed on the highest summits of the White Mountains.

Natural enemies. There are several insects which prey on this species. A minute, four winged fly known as *Telenomus graptæ* How. watches its opportunity to oviposit in the eggs of this butterfly. *Pteromalus fuscipes* Prov., was reared in Albany last summer from this insect. Three other Chalcids, *Pteromalus vanessæ* How., *Pteromalus puparum* Linn. and *Entedon antiopæ* Pack., all minute, four winged flies, attack the caterpillars, the former two sometimes in large numbers. Several ichneumon flies are parasitic on this species in Europe but no records of such rearings in America have been found. A dipterous parasite, *Euphorocera claripennis* Macq., has been reared in this country from the caterpillars. A fierce ground beetle,

Calosoma scrutator Fabr., is another enemy. This beneficial species is comparatively rare however. Two predaceous bugs, *Podisus placidus* Uhler and *P. serieventris* Uhler, prey on the caterpillars, as recorded by Mr Kirkland. The yellow and black billed cuckoos feed upon the spiny caterpillars.

Remedies. The gregarious habit of the caterpillars may be taken advantage of to cut off the branch on which they are clustered and then they may be killed by crushing. They may be dislodged by shaking, jarring with a padded mallet or by use of a torch and then crushed upon the ground. This species can also be controlled by spraying with an arsenical poison and when the caterpillars are very abundant, this will probably prove the most satisfactory way of controlling the insect.

Elm Borer.

Saperda tridentata Olivier.

This beetle is sometimes as injurious to the beautiful white elm as the sugar maple borer, *Plagionotus speciosus* Say, is to the sugar maple, and in places where this elm pest has become well established, even greater injury may result from its attacks. This is probably due to the greater prolificacy of the elm pest which sometimes occurs in large numbers beneath the bark, while the maple borer is usually present in much smaller numbers. The infested elms are also attacked by other insects, as will be shown in a subsequent paragraph, and the ultimate result is very disastrous to the trees.

Characteristics of attack. It is difficult to detect this insect till it has become well established and the first signs are usually seen in the lighter, thinner foliage followed by a limb dying here and there. Soon indications of boring are apparent in the dark sawdust collected in crevices of the bark and after the attack has progressed for some time, large portions of the bark can be easily pulled from the tree, revealing a condition beneath very much like that represented at figure 3 on plate 3. The inner part of the bark may be literally a mass of mines or burrows and if the work has not gone too far, numerous whitish, flattened, legless grubs may be found in the channels they have eaten out. The photograph reproduced herewith, figure 7, shows very well the condition of the trees after this pest has worked on them for a number of years. It was taken May 30, 1900, at Berlin, Mass., by Mr J. A. Otterson, and represents a small portion of two long rows of comparatively young trees.

Explanation of Plate 2.*

Fall Web Worm (*Hyphantria cunea* Drury).

1. Cluster of eggs, natural size.
2. Dorsal views of full and partly grown larvæ and also a lateral view of a full grown caterpillar.
3. Pupa, natural size.
4. Pupa, more enlarged.
5. White form of moth in resting position, natural size.
6. Spotted form of moth with wings expanded, natural size.

Figures 2, 5 and 6 are on a small web showing within the partly skeletonized, discolored leaves and the frass or excrement of the caterpillars.

Spiny Elm Caterpillar (*Euvanessa antiopa* Linn.).

7. Cluster of eggs on a leaf stem, natural size.
8. One egg, much enlarged, the dot beside it shows its natural size.
9. Caterpillar feeding, natural size.
10. Chrysalis hanging from a leaf stem, natural size.
11. Butterfly with wings spread, natural size.

The figures of the egg and caterpillar are on a twig of elm representing the characteristic work of the caterpillar.

---

*Executed from nature, under the author's direction, by Mr L. H. Joutel of New York city.

L. H. Joutel, 1900

FALL WEB WORM AND SPINY ELM CATERPILLAR

James B. Lyon, State Printer

Description. The parent insect is a modest gray beetle about half an inch long and marked with red lines and black spots, as shown at figure 4 of plate 3. The specimen represented is an unusually well colored individual, the dotting with black and portions of the red lines being frequently quite indistinct. The flattened, legless, whitish grub is shown curled in its burrow at figure 1 and the same extended at figure 1*a*. The pupa, within its elongated pupal cell, is represented at figure 2. It is a yellowish white, about one-half an inch long, and with slender antennæ curled along either side and bent back over the breast.

Fig. 7. Elms injured by Saperda and Magdalis. Berlin, Mass., May 30, 1900. Photo by J. A. Otterson.

Life history. The time necessary for this insect to complete its life cycle is unknown but reasoning from analogy, it seems probable that it is two and possibly three years. The larvæ that are to transform to beetles in one season change to pupæ sometime about the middle of May or earlier, and the beetles begin to appear the latter part of that month and continue to emerge for some time, examples having been taken as late as August 24. The eggs are deposited upon the bark in June,

according to the observations of Dr Fitch, but it would seem very probable that oviposition may occur much later, as the beetles are abroad till into August. The attack usually begins at the base of the tree. The young grub works its way under the bark and begins feeding upon the tissues and making a serpentine burrow. The boring increases in size with the growth of the larva and in the course of time the tree may be completely girdled and then it must soon die. Dr Packard, writing in 1870, calls attention to finding three sizes of larvæ and I have found it comparatively easy to separate those taken from a badly infested piece of limb in a similar manner.

Food plants. This insect appears to infest the white elm almost exclusively, though Dr Fitch records it as breeding in the slippery elm. I have seen no indications of it attacking the English or Scotch elms, so common in Albany. There is a record of this species having been reared from maple, but it would seem that the infestation must have been accidental.

Associated insects. Two species of curculionid or snout beetles may frequently be observed working in elms attacked by this pest, but they appear to follow and not to initiate an attack. *Magdalis armicollis* Say and *M. barbita* Say are both small beetles a little over a quarter of an inch long, the former reddish and the other black (Plate 3, figures 5, 6, and 6*a*). They are closely allied and the grub shown at figure 7 might well represent either species and the same is true of figure 8, which illustrates a pupa within its oval cell. The pupal cell is shown at figure 8*a* and the burrows of these insects at figure 9. The larvæ of these species transform to pupæ by the last of May, the beetles appearing in large numbers at this time. These insects apparently require but one year to complete the life cycle. They usually occur in the smaller limbs above where Saperda has been working but as this latter insect begins near the base of the tree and works up, it frequently occurs that the two species are found working together, as represented on the elm block figured on plate 3. These little beetles sometimes occur in immense numbers and then they are liable to parasitic attack. The following insects, most probably parasites of *Magdalis*, were bred from material in badly infested limbs. *Brachistes* (*Calyptus*) *magdalis* Cress., *Entelus onerati* Fitch, *Smicra microgaster* Say, a Pteromalid and a fly, *Limosina crassimana* Hal. The cocoons of an ichneumon parasite, *Melanobracon simplex* Cress., occurred in numbers under the bark where *Saperda* larvæ were abundant, on which the insect preys.

Another ally of Saperda, *Neoclytus erythrocephalus* Fabr., is less common than the two species of Magdalis. This is a small reddish beetle about three-eighths of an inch long and prettily marked with three yellowish, nearly transverse lines on

each wing cover. It usually follows *Saperda* attack in much the same way as does *Magdalis.*

Distribution. The elm borer has been recorded from the following localities: Provinces of Ontario and Quebec and from Massachusetts, Rhode Island, New York, New Jersey, Kentucky, Illinois and Michigan. It probably occurs in a number of other states.

Remedies. Badly infested trees should be cut and burned before the beetles have had an opportunity to emerge in the spring, that is before the latter part of May, in the latitude of New York. And in a like manner infested portions of others should be cut away and burned. This latter process was carried out on a lot of 1500 elms at Buffalo, N. Y., by Mr M. F. Adams, who reports that the trees were benefited in a most gratifying manner.

Protecting the trees during the period of oviposition with a carbolic acid wash has been frequently recommended but it is of doubtful utility. Where this insect is very abundant and its injuries correspondingly serious, it would do no harm to try the effects of a wash. One of the best may be prepared as follows: Thin a gallon of soft soap with an equal amount of hot water and then stir in one pint of crude carbolic acid, or one-half pint of the refined, and allow it to set over night. The next day add eight gallons of soft water and apply to the parts to be protected, which in the case of this insect would be the trunk and base of the lower limbs. The bark should be kept moist with this substance from the latter part of May through to the end of July.

Removing portions of the bark has also been recommended. The badly infested portion should be cut away and the grubs destroyed and where a few are working in living bark, it might be well to remove the upper layers till the grubs are nearly exposed and then brush over the shaven surface with strong kerosene emulsion or whale oil soap solution, finally covering the wound with a paste formed of a mixture of fresh cow dung and lime or with a coat of cheap, red paint.

Elm Bark Louse.

Gossyparia ulmi Geoffroy.

The elms of New York state are unfortunate in suffering from the attacks of two imported insects. The elm bark louse has proved itself a worthy second of its predecessor, the elm leaf beetle, and though it may not of itself be quite so injurious as this pernicious leaf feeder, still its constant sapping of elms already weak-

ened by repeated losses of their foliage is a serious matter. The extent of this drain is hardly appreciated till one observes the damp sidewalks, which even the heat of summer cannot dry, and the blackening fungus covering broad leaf expanses and indicating an equal amount of moisture,— all of which is drawn by these little creatures from the struggling trees. On bright sunny days in June it is very easy to see the exudations of these bark lice falling in showers from infested trees.

Introduction and distribution. This insect, like many of our worst insect pests, is an introduced species. It was first brought to notice in this country in 1884 by Mr Charles Fremd, of Rye, Westchester county, N. Y., who complained that thousands of elms in his nursery were infested. This species was probably accidentally imported several years previous to its discovery. It has now become established at a number of points in the Union, having been recorded from Vermont, Massachusetts, District of Columbia, Michigan, Nevada and California, besides localities in New York state. It is known to occur on Long Island and in a number of places along the Hudson river north to Greenwich, and it has been received from Ogdensburg, St. Lawrence county. Thus, if this pest has not already attained a general distribution throughout the state, it is only a question of time before that will occur.

Description. The adult females are by far the most conspicuous form of this insect. They may be seen clustered along the under side of the smaller limbs, usually along a crack or crevice in the bark, and presenting a general resemblance to a growth of lichens. The full grown, viviparous females are about $\frac{1}{10}$ of an inch long just before giving birth to their young, oval in outline and with slightly pointed extremities (Plate 3, figures 16, 16*a*). Each is surrounded with a white, woolly secretion, which also extends partly over the insect and thus renders its segmentation more apparent.

The young are yellowish specks and may easily be recognized as they move over the younger limbs and leaves (Plate 3, figure 15). They have an elongated, oval form, rounded anteriorly and tapering posteriorly to a pair of pointed processes, each bearing a long and a short seta. The body segments are marked by lateral spines and there is a row of six around the anterior border of the head and an irregular row down the middle of the back. The young soon become darker and finally assume a yellowish-red color. The dorsum becomes covered with spiny, wax secreting processes, and the general form of the young larva is retained (Plate 3, figures 10, 13). The antenna of the female before impregnation is composed like that of the young, of six subequal segments, the second and third being the longest and the fourth and fifth shortest. The antenna of the immature male has six nearly equal segments and a longer seventh.

The oval cottony cocoon of the male is well shown at figures 11, 12, plate 3. The presence of the perfect insect within may be known by the two long, protruding anal filaments. The male is not seen without special search. It is a delicate, two-winged, reddish insect with rather large antennæ, and a pair of white anal filaments nearly twice the length of its body (Plate 3, figure 18). It moves slowly over the limbs in a clumsy way, it is not easily disturbed and rarely takes wing. A most interesting feature is the occurrence of two forms. The normal one has already been described, but ten days earlier than its occurrence there may be found large numbers of males which are characterized by the possession of wing pads but no wings. These are known as pseudimagos and one is represented at figure 17, plate 3. The reason for the existence of two forms of males is unknown.

Life history. This insect is most conspicuous during the months of April, May and June, at which time the females are preparing to give birth to their young, which make their appearance in the latitude of Albany early in July. The new born insects move rapidly over the bark for a time and then settle along the veins of the leaves, principally the midvein, and in large numbers on the greener tips of the twigs. Occasionally a twig will be almost yellow from the large number of young nearly covering it. Others establish themselves in crevices among the old females. They remain in these positions till into September or later and then those on the leaves migrate to the twigs. Some do not take this precaution soon enough and are carried away on the falling leaves and scattered by the winds. The winter is passed by the partly grown insects which are quite well protected by a waxy secretion from the dorsal and lateral processes. The first warm weather in spring brings signs of activity. Early in April the females molt and the males form their cocoons. At this time many travel considerable distances before establishing themselves, this is specially true of the males, which are quite apt to spin cocoons on dead twigs. Honey dew is excreted by the females in very large quantities from this time till the young appear in July. This is evidently the period when the insect is most injurious. The wingless males or pseudimagos were present in large numbers May 10, 1900, while the perfect males were not abundant till May 21 and there was a time between these dates when no males could be found. Soon after pairing there is a marked difference in the appearance of the female. Her form changes from elliptic (Plate 3, figure 14) to oval (Plate 3, figure 16) and the secretion of the wax is much more copious and is mainly from the lateral spines instead of from both lateral and dorsal, as occurred in the fall.

This bark louse, like the elm leaf beetle, appears to thrive best on the European species of *Ulmus*, specially the Scotch elm.

Explanation of Plate 3.*

Elm Borer (*Saperda tridentata* Oliv.).

1. Larva or grub within its burrow just under the bark, natural size.
1*a*. Larva or grub extended, natural size.
2. Pupa within its cell just under the bark, natural size.
3. Burrows of the grub as exposed after removal of the bark, natural size.
4. Adult beetle, line beside it shows its natural size.

Elm Snout Beetles (*Magdalis*).

5. Adult of *Magdalis armicollis* Say, line beside it represents its natural size.
6. Adult of *Magdalis barbita* Say, line beside it represents its natural size.
6*a*. Side view of same.
7. Larva of *Magdalis barbita*, side view, natural size.
8. Pupa of *Magdalis barbita* within its oval cell just beneath the bark, natural size.
8*a*. Empty pupal cell of *Magdalis barbita*, natural size.
9. Burrows of *Magdalis barbita* as exposed after removal of the bark, natural size.
9*a*. Holes in the bark through which the beetles escape, natural size.
9*b*. Showing how bark is loosened by the burrows of this insect, natural size.

Elm Bark Louse (*Gossyparia ulmi* Geoff.).

10. Group of partly grown bark lice as they appear in early spring, natural size.
11. Group of male cocoons, natural size.
12. Group of male cocoons, much enlarged.
13. Group of virgin females, much enlarged.
14. A female, much more enlarged.
15. Recently hatched young, very much enlarged.
16. Mature female, much enlarged.
16*a*. Mature females on a twig, enlarged.
17. Pseudimago or wingless male, much enlarged.
18. Winged male, much enlarged, note also the long, white, anal filaments.

*Executed from nature, under the author's direction, by Mr L. H. Joutel of New York city.

ELM BORERS AND ELM BARK LOUSE

L. H. Joutel, 1900

James B. Lyon, State Printer

Means of distribution. This insect can be carried long distances on young trees and it is undoubtedly in this way that it has succeeded in establishing itself at the widely separated points named above. Its rapid dissemination throughout a city is probably due to the agency of birds, particularly the English sparrow. There appears to be no other adequate explanation of the general occurrence of this pest throughout Albany and Troy. It is also possible that the young falling with the leaves are blown to new localities and succeed in establishing themselves on uninfested trees. This latter means is so uncertain, compared with birds which habitually fly from tree to tree, that it cannot be considered as a source of much danger.

Natural enemies. It is very probable that a number of lady bugs in both adult and larval condition feed to some extent on the young of this insect. The two spotted lady bug, *Adalia bipunctata* Linn., has been seen in considerable numbers about infested trees in Albany but it was not observed feeding upon the pest. Many flies and other insects are attracted to infested limbs by the abundant honey dew.

Remedies. Spraying with a contact insecticide, kerosene emulsion or a whale oil soap solution is probably the best remedy for this insect. This treatment will be most effective if given early in the spring just after the hibernated forms have molted or soon after the young make their appearance. A solution four times the normal strength is necessary to kill the insects late in the fall. Spraying the infested trees in early spring with a 20 per cent mechanical emulsion of crude petroleum would probably prove very effective and not injure the elms. It would hardly do to apply this to trees where a little oil would be objectionable as the petroleum remains on the bark for a considerable period. Small trees have been effectually cleaned by going over them with a stiff brush and this would be more effective were it done in early spring and the brush kept well wetted with kerosene emulsion or whale oil soap solution. A good stream of cold water would be much better than nothing and when directed against the masses of females could hardly fail to wash off large numbers. This latter method is advisable only where a good head of water and hose is convenient.

Some European Forest Scenes.

By Dr. JOHN GIFFORD.

1. FAGOT-GATHERERS NEAR PISA.

IT is highly important that every American forester should spend sometime in the forests of Europe. He should not confine his visits to Germany, but sojourn also in Belgium, Holland, Denmark, France, Italy, Switzerland, Austria and if possible Russia. Aside from what he learns he needs the encouragement of meeting men in the same profession in a region where its importance is recognized and where there is some *esprit de corps*. One gets tired of explaining in a half apologetic way the nature of his profession. Intelligent people seem slow to grasp the scope and meaning of the science and art of forestry. This is excusable when we consider that some of our large cities have city-foresters without forests, and that even some American foresters have written to the effect that forestry and lumbering are practically identical, and that what the lumberman has done and is doing is perfectly right in that it seems perfectly adapted to the peculiar conditions which exist in this country; that true forestry is a long way in the future, etc. One soon begins to doubt the significance of the profession.

After a few days sojourn in the Black Forest or in Saxony, however, or in fact in almost any part of Europe, he feels that he is in a noble profession and that the fault is with his countrymen and not with himself or his vocation.

No man can know what is meant by forestry until he sees forests which have been well managed for a considerable period of time. Such forests do not exist in this

country. They exist in greatest variety and perfection on the continent of Europe; therefore, it is self-evident that Europe is the place to go.

There are those who belittle the importance of a visit to the forests of Europe. It is not only pleasant and instructive, but absolutely essential. Who would employ a forester who had never seen a well-cared-for forest? It is required of English forestry students, and when English forest officers come home from India, although the conditions in India are as unlike the conditions in Europe as is possible, they visit the continent to gain a little refreshing encouragement as well as to learn something of importance about their profession.

It is not necessary to spend a long period of time there; in fact, short visits are preferable. Neither is it necessary to attend a German or French university; in fact, better not. But it is highly important that every forester should visit the important typical forest regions of Europe long enough and often enough to gain an intelligent comprehension of their management.

One must not condemn nor praise everything, and must not judge too quickly. Europe is too often rated by Americans who go in groups on personally-conducted tours, stopping at hotels where English is spoken, and practically "doing" the country in a most superficial and unprofitable fashion. Europeans generally have no better opinion of such Americans than such Americans have of Europe. One knows less about Europe after a sojourn of two years than one ordinarily thinks he knows at the end of three months. It is extremely difficult to draw conclusions or make comparisons.

No American forester is stupid enough to think that all he sees in the forests of Europe is directly applicable to this country, and that the State should at once proceed to put a similar system in force here; neither is he stupid enough to believe that he can learn nothing in Europe which is applicable to this country. What one sees there is quite as applicable to this country as it is to other countries, and more applicable perhaps than what one sees in New Zealand or Australia, although both of these countries are as new and modern as America.

What one sees in Europe, India, or elsewhere is mainly suggestive. Even in forestry, Europe and other countries have received help and suggestions from other countries, and even from America. American implements are gradually working into Europe. Arbor Day is an American institution which has been adopted in several European countries, and Europeans are using American species in greater numbers every day. It is not uncommon to see forests of American locust, red fir, walnut, tulip-poplar, red oak and other American trees in Europe.

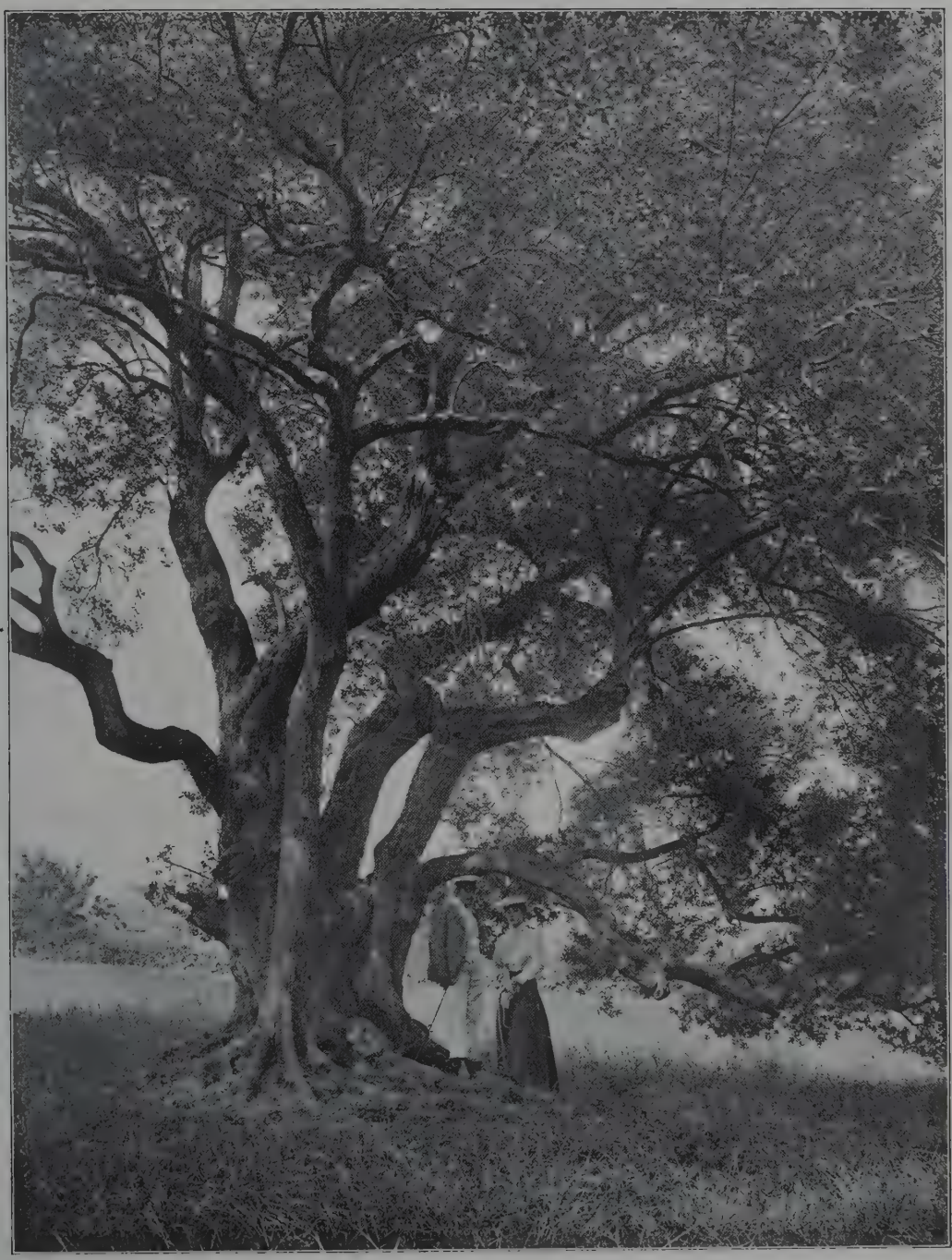
The visitor to Europe should not neglect above all things to study something

2. THE FAMOUS FOREST AND FORESTRY SCHOOL AT VALLAMBROSA, ITALY.

THIS WAS FORMERLY A MONASTERY. THE TREES WERE ORIGINALLY PLANTED BY THE MONKS.

3. AN OLIVE-COVERED HILLSIDE NEAR FLORENCE, ITALY.

BETWEEN THE ROWS OF TREES FIELD CROPS ARE GROWN.



4. AN OLD OLIVE TREE.

of the history which has led to the present condition of affairs. To know the nature of the condition of an institution one must know something of the environment under which it developed. There has been give and take throughout the whole world for ages. A process of universalization is going on at all times. The great development of the grain industry in Russia is due primarily to the introduction of American machinery. On the other hand, the introduction of the macaroni wheats into this country has had an equal if not greater effect on our own wheat industry.

The visitor abroad will not be surprised to find that in Europe certain parts have long ago passed through the stage we are now in; that there are still areas in Europe in a stage similar to parts of this country at the present time; and that other parts are in a stage which cannot be reached by this country for a period of centuries. In parts of Europe there is an abundance of wood; in other regions it is extremely scarce; and these regions may be within an hour's ride of one another. I have eaten a lunch cooked over the roots of grape vines and small sticks no larger than lead pencils, and have had dinner cooked over a fire of pine logs in a large open fireplace. Both of these places are in France within forty miles of one another.

Europeans do a great deal of visiting to learn of one another's progress. I have seen a group of Italian and a group of Spanish students meeting in France to inspect the work of reboisement in the mountains when the renowned Demontzey was living. English, Dutch, Belgian and French forestry students visit Germany frequently, and German students in turn go to Russia and Denmark. German forestry students could learn much in this country. They could see species which they have imported growing under natural conditions, and they could gain many valuable points from an inspection of our system of wood transportation and conversion.

Although we compare favorably with other nations in that we have two schools of forestry, a bureau of forestry at Washington, almost fifty millions acres of reserved land, etc., we are wofully backward in that this enormous tract of magnificent forest is neglected and in general not even protected from fire and thieves. The State of New York has done something in purchasing the Adirondack forest land. This, however, is the merest beginning. Even protection is not firmly established. The protection of forests is essential. Until extensive fires become an impossibility, forestry is not possible. The prevention of fire, the removal of brush and the leaving of seed trees were the first steps toward forest conservation in Europe.

It is well to visit Europe several summers in succession. Places of interest are so close together that one can become easily muddled and bewildered by the host of new impressions. One can become easily tired and satiated. The mind after

weeks of travel loses its freshness, and the impressions gained may be soon forgotten or may be imperfect in consequence. One should visit one region well and then return home to reflect, digest and modify these impressions.

Many Americans claim that Europe is effete and declining, that the people lack ginger, and that society is in a stratified condition; that owing to the density of population land and materials are scarce and labor abundant; that the people are conservative; that the tools in use are clumsy; that the government is too paternal; that transportation is too slow, etc.

One's conclusions, however, may be easily upset. In Holland alone there are large areas of uncultivated waste land. Land is cheap in some parts of Europe, and one is surprised to find a new settlement on the heath lands of Holland called "America." Labor is abundant and cheap, but it costs just as much to do things in Europe as it does in America. With American machines an American could harvest a forest crop as cheaply if not cheaper than it is harvested in Europe. Europeans in this country say that they worked harder and longer in Europe, but they accomplished no more; in fact, less. An American with an American axe can chop twice as much in a day as a German can with some of the axes I have seen in use in one of the finest forests in the world. Progress has been by leaps and bounds in parts of this country. But this progress has been often one-sided. This is usually the case when things go with a rush. Europe has been held back. She has been hampered by the inheritances of ages. A new country is free from these fetters, but suffers from other dangers. We have gathered together much of the loose, restless material of the whole world for a population. This has been planted in a region where there have been few restrictions on individual liberty. Here a man may set fire to another's land to improve the berry crop or pasturage. He may even take the law into his own hands at times to hang a horse thief, or lynch a negro, or do what has been often done in this country — set fire to woods in order to be able to buy it cheaply for charcoal; or, in other instances, to get the job of helping to extinguish it. Europe has too much conservatism and paternalism — and we have too little. This to be sure is the spirit of this country, well illustrated by gangs of small boys in the woods shooting at all kinds of birds at almost any time of the year.

One often meets with what appears to be anomalous conditions in Europe. I have seen natives drying cow dung for fuel in one of the finest forests of Germany.

There is one important difference between Europe and this country and it seems to me the most important. This country, in spite of the great variety of people which constitute it, is homogeneous throughout. Europe is divided into many small states, each with customs, language, aspirations, jealousies, and laws of its own.

5. HARVESTING OLIVES.

6. THE EUROPEAN CHESTNUT.

A TREE WHICH YIELDS BREAD AND WOOD.

7. CHOPPING WOOD FOR CHARCOAL IN FRANCE.

NOTE THE FAGOT CLEAVER IN THE HAND OF THE MAN ON THE LEFT.

This interferes with transportation and progress. Affairs are always more or less local. The value of things varies in every little district. One may ride through a dozen languages in one day. In Switzerland alone, a country not much larger than the Adirondack region, there are four distinct tongues, not to mention dialects. There are dukedoms, principalities and little republics galore. In the heart of Italy there is the little republic of San Marino, a mere spot on the map, with a history which would fill volumes. Even in Germany the various states and cities are more or less independent. Wurtemburg, for instance, sends a consul to Bavaria, not so much because he is needed but as a sign of independence.

8. FAGOT-GATHERERS NEAR PISA WITH CART. MOUNTED SOLDIERS IN THE DISTANCE.

Aside from all these local conditions and differences, which may or may not exist between this country and Europe, one thing is certain, and that is this: there have developed in Europe systems of forest production, care, and utilization which are highly praiseworthy and more or less applicable to all parts of the world, even to the Tropics. These rudimentary principles may be taught and applied with modifications in Austria, America, South Africa or India just as European systems of agriculture have been applied throughout the world.

Deprive Germany of her forests and you will produce many paupers. Were the peasants allowed their own way they would cut and slash regardless. They would soon use the money, and soon find themselves paupers in an impoverished country. This, a paternal government wisely prevents. The German forest is a perpetual living resource. The increment alone is cut, the principal must remain forever intact.

Photos Nos. 1, 7, 8 and 9 illustrate the small size of the material which is used in Europe, and the nature of a great deal of the labor.

Nos. 1 and 8 are Italian pictures, near Pisa. This is grandmother's work. They come into town with immense loads of brush wood for fuel. In Italy, where wood is scarce, it is bought and sold by weight. It is usually well wet when sold. In No. 1 the poorest stage is shown. Attached to each bunch is a wooden prop so that they can rest their weary backs without dropping the load. In No. 8 the women wear shoes and possess a wagon. The next step is where the vender owns a donkey. In the distance are mounted soldiers. This naturally consumes much of the best labor of the country, and leaves the women to do most of the hard work. This is not confined to Southern Europe; it is so throughout the whole of the continent. No. 12 is a scene in Finland, showing women at work in the field binding the grain which has been cut with a scythe. In the background is a fine young forest of spruce.

Italy is a good type of those old southern countries which have consumed their supply of wood. One can learn quite as much in Italy as in Germany. One can see the effects of deforestation, and the possibilities of reforestation as at Vallambrosa. The people of Italy are on the whole good, but the government is bad. The people are industrious and frugal. Their valleys and hillsides are covered with orchards and vineyards. Horticulture and agriculture are extensively developed, but their mountain tops are neglected and bald. What they are capable of being is shown at Vallambrosa (No. 2).

No. 16 shows the Royal Italian Forestry School at Vallambrosa. It is beautifully located in the midst of forests planted long ago by the patient and industrious monks. Vallambrosa was once a famous monastery. It must not be forgotten that many of Europe's finest forests originated in this way. Just as the monks kept agriculture alive through dark and rebellious times, so with forestry; more so, in fact, because they became in time the custodians and owners of vast areas of forest land. Many of the buildings and much of the land now used for forestry purposes in Europe were once the property of the church. No. 2 gives a better view of the school at Vallambrosa. It seems strange to enter the dining hall and refectory of this old monastery and see students of forestry instead of monks. The pictures of the monks adorn the walls; but it is the vast stretches of magnificent forests and the great solid walls which stand as a monument to their industry and skill.

9. MAKING CHARCOAL IN FRANCE.

10. SAWING BEECH LOGS IN FRANCE.

NOTE THE NATURE OF THE SAW.

11. CHOPPING WITH A CLUMSY EUROPEAN AXE.

NOTE HOW CLOSE TO THE GROUND THE TREE IS BEING CUT.

Ask an Italian how much of his country is forested and he will say sixteen per cent, including olive orchards. This is no worse than saying that this country is thirty-five per cent forest. We really mean that the United States is thirty-five per cent woodland swamps and brush and bushland.

No. 3 shows the nature of their olive covered hillsides. Between the rows of olives field crops are grown. This is at Fiesole near Florence. Willows, poplars and mulberries are grown in the same way, and frequently lopped to yield fagots and fodder. This combination of horticulture and agriculture is delightful, but the hill-

12. A SCENE IN FINLAND.

Note the absence of a reaper and binder, and the presence of a well cared for spruce forest in the background.

tops are neglected. This is the fault of the government, which should take care of such places. With well-cared-for forests in the mountains Italy would be intensively tilled throughout. There are vast areas of unused waste land in Italy which should be covered with forests. These beautiful orchards and groves in part compensate for the absence of forests. No. 4 shows an old olive tree. No. 5 shows the harvesters of olives. At this time these orchards are fascinating beyond description, when the peasants come dressed in bright costumes with carts drawn by large snow-white oxen.

It is in Italy where the chestnut is cultivated so extensively and so highly prized and utilized. Bread of chestnut flour is often the mainstay of the people. It is cooked as a vegetable with Brussels-sprouts. It is also candied and sold as a confection. The coppice furnishes fine vine stakes. The bark yields tannin. There are chestnut trees on the slopes of Mt. Ætna which bore fruit when Homer was a boy. No. 6 is a twig of the European chestnut showing some young fruits. It is not essentially different from our own chestnut, but the photograph is worthy of reproduction.

It is in southern countries where charcoal is most extensively used. It emits little smoke or other odors that would taint food. It can be used in pots and braziers without chimneys or stoves. It can be manufactured from the small wood of the forest. All through Southern Europe the smoke of charcoal burners may be seen in the hills. Nos. 7 and 9 show charcoal burners in France. The wood is mostly poplar. It is cut and sorted so that there is little waste. Most of the chopping is done with a cleaver, shown in the man's hand in No. 7. As I have already said, European implements are crude.

No. 10 shows the kind of saw used on heavy beech logs. It is not unlike our common buck-saw, and is decidedly inferior to our common wood saws. In the conversion of timber the cheapness of the labor is more than offset by the crudity of their implements.

No. 11 shows an European axe. The tree is being cut close to the ground; the wood is carefully cut and sorted; even the brushwood is bundled, but the axe, as far as shape is concerned, belongs to the Bronze age, when the natives of Europe dressed in skins and ate uncooked meat. We can excuse the handle, because they have no hickory, but the blade is inexcusable in this day of labor-saving devices and comfortable tools.

No. 13 shows two peasants sawing boards by hand in France, not far from the city of Paris. This method is practiced in all countries where sawmills are scarce. How much labor would be saved with an American portable or vest pocket sawmill! This is the way their fathers did it. This same method is practiced in the Philippine Islands.

In France a farmer sticks cuttings of poplars in the ground along the banks of a stream and in the pastures. The side branches are lopped from time to time for fuel, and when the main trunk is large enough it is sawed by hand into boards. The boards are not large, and are carefully piled in the shape of a house, with a projecting roof to protect them from the weather.

Machines have developed to a wonderful degree in this country. Europeans all

13. SAWING BOARDS BY HAND NOT FAR FROM THE CITY OF PARIS.

NOTE THE HOUSE–LIKE SHAPE OF THE BOARD PILE.

14. A FIRE LANE AT THE FOOT OF THE GRAND DUNE IN GASCONY.

15. AN OYSTER PARC, WITH A FOREST-COVERED DUNE IN THE BACKGROUND, NEAR ARCACHON, FRANCE.

admit that the American is practical and able to do things easily. He has skill and ingenuity. Our sawmills work well; in fact, too well. They have divested our hillsides of their covering of green in short order and with disorder. In Europe the forest is produced with great skill and foresight, but is utilized and converted with clumsy implements.

16. THE FORESTRY SCHOOL AT VALLAMBROSA, ITALY.

The American in visiting a European forest naturally remarks that the utilization of small sticks, etc., is all well enough when it is possible. In America, however, there is no use for such rubbish. We have no time to bother with it. We grind fine lumber into paper pulp, split the big trees of California into grapevine props, and throw away slabs which contain as much lumber as some saw logs. The European in reply reminds you of the fact that corn was used for fuel in Kansas when corn was cheap and fuel expensive. "With all your ingenuity you should devise a use for this material. You utilize the pith of cornstalks, old iron, apple cores and peelings, old rags, even old paper and junk, why not brushwood?" The utilization of these materials is as important as any other branch of the subject.

There are parts of Europe, however, in which there is plenty of wood, and where the forests are protected and properly exploited, more for the good they do in holding in check the destructive forces of nature than for the wood they yield.

No. 14 shows a scene on a fire lane at the foot of a sand dune in Gascony. Here there is wood to burn, and they often have forest fires which are almost American in nature. This district was once inhabited by a lot of timid, sickly shepherds, who walked from place to place on stilts. The region was either a pestilential swamp or a mass of shifting sand. Now it is a health resort.

No. 24 shows the method of tapping trees for resin in this district. This tree is being tapped to death purposely, because it interferes with the growth of an oak near by. This is not the true cork oak, but a species of southern oak which yields cork. In general the pine trees are very carefully tapped, so that they live to a ripe old age and produce in the course of their lives a large quantity of resin, quite a contrast to the system practiced in our south. There has developed a very fine set of implements and machines for collecting and manufacturing resin in France.

No. 15 shows a forest-clad dune in the background. This mass of sand which fringes the Bay of Biscay is held in check by a forest of pine. In its lee and depending upon its protection are extensive oyster parcs where the oyster is reared from the egg. Many a well-to-do peasant has a farm under water in this district. The stakes are to prevent big fish from settling on the beds. The women do a great deal of this work, and being more prosperous and up to date than their sisters in Italy and Germany wear pants while working in the water.

Travel southward into the Pyrenees or northeastward to the Alps and you will see extensive works in the mountains for the prevention of floods. It requires great calamities to arouse people to the possibilities of their efforts. The shifting sands of France which buried villages, and the floods of the Rhone, opened the eyes of the people of France. Would that the loss of six hundred lives in forest fires in Minnesota in one year had the same effect!

No. 17 shows the nature of some of the work in the mountains of France. To tame the torrent it must be attacked in the rills of its source where its forces are small and scattered. This was once a forested region. It was deforested, pastured, eroded and ruined. On this very spot there is again a forest produced by hard toil and infinite pains. How fortunate the country which possesses forest-clad mountains and fertile, well-cultivated valleys! Such a country will be stable and free from starvation. In spite of social and political drawbacks, in spite of the inheritances which fetter her, Germany is such a country.

No. 18 shows a typical German scene. There are well-forested mountains, with the exception of a bare spot due to a landslide, with fertile meadows and fields below in the valley, with a fine stone road and forest-fed stream, the former to facilitate traffic, the latter to grind the grain and saw the wood.

17. REFORESTING A DEFORESTED MOUNTAIN-TOP IN FRANCE.

18. A FOREST SCENE IN GERMANY.

A LAND OF FOREST-CLAD HILLS AND WELL CULTIVATED VALLEYS.

19. THE EUROPEAN SPRUCE.

COMMONLY CALLED THE NORWAY SPRUCE (*Picea excelsa*).

Many say forestry is not possible in this country while wood is so abundant and cheap. When wood becomes scarce and the pinch of want is felt, then there is time to begin. Transportation is so perfect and long-distance freight rates so convenient that the pinch of want will not be felt until the forests of the remotest corners of this country, and perhaps also Canada and Mexico have been cut. Germany has proportionately more wood than we have; and, on the average, good wood costs little, if any more. The difference is, Germany is using only the increment; the principal remains intact. We are spending our forest principal, just as a spendthrift wastes his patrimony. The place to begin forestry is in the primeval woods, and not after all the choicest has been cut. The lumberman chews the meat from the bone, and then the forester is given the bone; and even more, he is expected to get much out of it.

Many spruce forests are raised in Germany to furnish paper, on which the German professor may give to the world the results of his thoughts and observations. Saxony is the leader in this respect, and Leipsic, its capital, is a famous book centre. The word "book" comes from the old German for beech, and the word "library" comes from the Latin for bark.

No. 21 shows the nature of a German spruce forest. This photograph was given me by Mr. Carey of Maine. A forest of that kind contains some good wood. There is practically no rubbish or waste material of any kind. Every splinter of it is used.

The European spruce is a great tree. It is superior to our native eastern spruces. Even botanists quarrel as to the identity of our species. No seed collector could ever tell just what he is collecting. Our spruces have small cones, and the seed is difficult and expensive to collect. The European spruce grows well in this country; the seed is cheap and it is easily recognized. Strange to say, however, the Danes are using our white spruce, and we shall soon be buying white spruce seed in Denmark. The same has already happened with the white pine. The place to buy white pine seed is in Germany. The white spruce is the best tree which the Danes can find to withstand the rigors of their tempestuous heathlands. No. 19 is a picture of the common European or Norway spruce.

Our common black spruce in the Adirondacks, especially in the swampy districts, is infested with witches broom, due to a small mistletoe. This mistletoe is extremely abundant in northern Michigan.

In Europe the mistletoes do an immense amount of damage. I have seen it in France on the poplar and locust. It is collected and shipped in large quantities to England. Its abundance is shown in No. 20.

A very important European conifer, and one of universal reputation, is the Scotch

pine. It is one of the most beautiful and useful of trees. It grows with wet feet in the bogs of the north, in the dry sands, and even on the hard dry soil of our western plains. In places it is short and crooked, in others a tall, beautiful tree. No. 22 shows a Scotch pine woods in Bavaria. Around every tree there are two black marks. These woods are literally in mourning. This is raupenleim. It did no good, but when the modest-looking nun-moth came in such immense numbers, threatening to destroy in a few days one of Germany's greatest resources, which had been a century in growing, the forester had to do something; so he painted a black streak on every tree in Bavaria. The nun-moth finally disappeared as quickly and mysteriously as it came.

I spent many pleasant days in this forest. The ground was carpeted with a soft mat of moss. There was not a weed or bush. The golden trunks of the pines were as straight as spars, and above there was a solid canopy of rich, fresh green silvery foliage. Every now and then a few deer would show themselves, in fact come so near that I could take their picture. The farmers nearby were busy in the fields, and would stop now and then to drive them away from the tender grass back into the forest to which they belonged.

In spite of the beauty and great usefulness of the conifers, the European leans toward the hardwood. He is the lover of beech and oak. They are essential to the *gemüthlichkeit* of the old world. Their mast feeds the pigs, their wood warms the body, their beauty warms the soul, their litter fertilizes the soil, and out of their wood comes the staves which make the barrels and casks in which his precious wine and beer are kept. Such a forest is No. 23. It is located at Compiegne near Paris. It yields a high revenue, is beautiful beyond description, has been the hunting place of kings for ages, and, as with Vallambrosa, St. Hubert, St. Blasien and a host of other European forests, has associated with it an everlasting history. In Europe a forest is something more than a mere bunch of merchantable wood.

It is impossible to rate the value of a forest in dollars and cents. How true are the following words of D. E. Hutchins, forest conservator, located at Cape Town! He came back to England, visited Germany, and then wrote at follows:

"The prudent foreigner, looking across his wooded mountains, will tell you that England is rich and can well afford to pay in the future for her present forest improvidence. There is more than this in the forest question, and to my mind it is quite the saddest aspect of it.

"Great Britain now pays about £20,750,000 annually for imported wood and forest produce that could be produced equally well in the British Isles. Broadly speaking, this wood is paid for by manufactured goods produced by the labor of the

20. A CLUMP OF TREES IN FRANCE INFESTED WITH MISTLETOE.

21. A GERMAN SPRUCE FOREST.

22. A SCOTCH PINE FOREST IN BAVARIA.

23. THE FOREST OF COMPIEGNE, NOT FAR FROM PARIS.

factory operative, that physically degraded type of humanity one sees in all big manufacturing towns. With the destruction of the forests in England have gone the stalwart men who once worked in them; to be replaced by the factory hand — weak-lunged, knock-kneed and sallow. One has only to travel through the forests of the continent of Europe and then visit a few of the large manufacturing towns of England, to have this physical degeneration of the race brought home in the most forcible and unpleasant manner. The wood industries are mostly healthy (to a great extent out-of-doors) occupations, and they usually employ a robust country population living partly on their forests and partly on their gardens and small agricultural allotments. But let us consider the one million people that in Germany live and labor in the forests. What a reserve of national strength! They are fairly, most people would say sufficiently, educated; and their healthy life in the open air and constant exercise preserves a physical development, a strength of frame and constitution, that is rare in these days of machinery and easy chairs! Judging from what I saw at a recent visit to the forests of Germany and the big towns of England, I should say that England could better afford to pay £20,750,000 for foreign wood than to lose the broad-shouldered and muscular men who once worked in her forests. These are the men whom we value as colonists — men fitted to go forth and subdue the waste places of the earth."

24. TAPPING TREES FOR RESIN IN FRANCE.

Forest Taxation.

By C. A. SCHENCK, Ph. D.*

THERE are found in this country thousands of cabins and houses, uninhabited and uninhabitable, with the roofs and windows gone, the floors destroyed, and the sides falling to pieces. Apparently it does not pay the owner of such ruins to keep the place in good repair.

There are thousands of forest tracts in this country, unproductive and neglected, with the merchantable timber gone, the vegetable ground-floor destroyed by fires, and a few decrepit and worthless trees gradually falling to pieces.

Here, too, it does not pay the landowner to keep the woods in good condition; the outlay required for forest preservation is found to surpass the revenue derivable from such expenditure, in the very large majority of cases.

Unfortunately for the commonwealth, the neglected forest forms the rule; the preserved forest is the exception. We never think of putting before the owner of a dilapidated cabin the financial wisdom of proper repairs and of timely care. That owner, without a doubt, understands the requirements of the case better than an outsider.

On the forest owner, however, all bystanders (who, of course, do not own a foot of woodland) lavish their kind recommendations and friendly advice with a view of bulldozing him into forest preservation and sylvicultural care.

---

*Forester to the Biltmore Estate, N. C.; Principal, Biltmore School of Forestry; and Forest Assessor to the Government of Hesse Darmstadt.

As if the American forest owners, the American lumbermen, were not in the foremost rank of the most successful business men on whom the sun ever shone! As if the "lumber jacks" destroying the forests were blindly following an old-fashioned usage, without weighing the financial pros and contras of every feature of their business!

Conservative Forestry as a Business.

A good business is that which yields safe returns, steady returns, and high returns on all business investments.

Forestry is an insecure investment as long as wood fires prevail.

Forestry is a clumsy investment, yielding irregular returns, as long as there is no steady market for forest produce, as long as the country develops by leaps and bounds; as long as the chances for quick-witted speculation continue to be numerous elsewhere in this wonderful country.

Forestry yields small returns as long as forest preservation involves a large *annual outlay* spent for protection and for taxes, an expense not counterbalanced by adequate *annual returns*.

Sure enough! If forestry could offer a fair chance of *very high* returns, the owner would willingly stand the risk of its insecurity and the fatal clumsiness of the investment.

The chances, however, for *very high* returns to flow from investments in conservative forestry are pretty slim.

In America we are still facing enormous surplus stores of timber, surpassing the annual demand a hundred fold. Thus, for a long time to come, the demand for forest produce is not apt to be out of proportion with the available supply.

All over the world forests do not grow at an annual rate of production exceeding five per cent. Thus we cannot expect to derive a high rate of interest from forestry as a business.

These circumstances are beyond the sphere of human influence. There are other impediments to forestry, however, which the people, with a view of leveling the road to forestry, can remove as soon as they want to.

Restricted Rights of Ownership.

Take the term "forest property." It implies, legally, "the power of exclusive use and exclusive control of a wood, for the owner's benefit."

Does the wood owner have the exclusive use and benefit of his property?

F. A. VAN SANT, PHOTO.

AN ADIRONDACK TAXPAYER.

Certainly not — others, the people, are benefited by the good influence emanating from the forest on water supply and health supply.

Others, everybody, are catching the fish in the owner's forest brook, or are killing the deer on his premises.

Others camp and roam about on his land, using and enjoying it, free of charge, as if it were their own.

Of course, nobody is or should be so foolishly egotistical as to monopolize the entire use of his property, while many a neighbor might share in its enjoyment without detriment to the object. Still, is it wrong for the owner to demand that these neighbors, that Mr. Everybody, that the people, help him in carrying the financial burden which forest preservation implies? Does any bystander realize what this burden is?

Taxes on Young, Immature Forests.

The heaviest part of the burden consists of taxes.

Where forestry is well established, yielding a steady, annual revenue, these taxes are easily defrayed out of the revenue.

Where forestry is in *statu nascendi*, as is the case in America, yields can be expected only every twenty-five or thirty-five years. In the meantime taxes are imposed upon the forest as if it were as useless to the people as barren jewelry. Is a system of taxation which is economically indicated in the case of unproductive values justifiable in the case of wood lands? Just think, how these taxes accumulate in the course of the years, at compound interest, and how they curtail the gross revenue derivable after, say, thirty years of forestry!

Let us use an Adirondack example:

Given a tract of land from which the "timber" has been removed, worth now $1 per acre. That forest is expected to yield (provided that fire does not play havoc with our expectations) every thirty years, per acre of ground, 1,500 feet b. m. lumber worth $2.25. The annual taxes will be, on an average, about 1 1-2 cents per acre; at the end of thirty years, they have accumulated, at 6 per cent interest, to $\frac{0.015\ (1.06^{30} - 1)}{0.06} = \$1.18$ ~~cents~~ per acre.

In other words, from the gross revenue of $2.25 an amount of $1.18 is taken away by taxation, allowing a net revenue of only $1.07 to remain!

A capital of $1.00 (the supposed value per acre) returning $1.07 every thirty years, yields 2 1-2 per cent of annual interest.

The banker and business man, who is accustomed to figure at compound interest, will find my statement correct.

If forestry as a business promises, in the Adirondacks, only 2 1-2 per cent on its investments,— investments constantly threatened by fire,— I myself would not care to engage in it, although I claim to be a practical forester.

An optimist, of course, may claim that advancing lumber prices will result in much larger returns than those given,— say $4.50 instead of $2.25 per acre.

Very well; but, if lumber and stumpage prices show an increase, will not the taxes advance at a similar ratio, badly curtailing the revenue derivable from forestry?

There is another consideration worth looking into: Under forestry, after cutting the mature timber, we raise a second growth or a second crop of trees, and thereafter a third, and a fourth crop, etc., etc.

While raising the crop, we are paying taxes on it.

Now, friend farmer, what would you say, if the law required you to pay taxes not on the soil value only, but on the crop value standing on the soil as well? Suppose your soil is worth $10 per acre and your crop of corn standing on it $15. Would you not make a wild "kick" if the tax assessor dared to rate your field at $25? As a matter of fact, in forestry we are compelled to pay taxes on soil plus crop.

Obviously, the forest owner should be held to pay taxes on the hyper-mature stumpage, which corresponds with mature grain crops stored away in a farmer's barn. But it is evidently unjust to tax the immature stumpage left after the hyper-mature trees are removed.

Taxes on Real Property.

Everybody knows that real property is more heavily taxed than personal property, for the reason that the former is assessed by public officers, while the latter is assessed by its owners.

These "owners" (I confess myself to be one of them) are in the habit of considerably underestimating the value of their personal belongings when listing taxes. "Everybody cheats a little," — and what everybody does, that, of course, cannot be very wrong.

Several States have tried to relieve such unequal and iniquitous taxation of realties, prescribing that realties should be assessed only at 60 per cent or so of their proper market value.

F. A. VAN SANT, PHOTO.

IN THE FOREST PRESERVE.

Whether such legislation leads to the desired effect seems very doubtful. The owner of personal property will consider it a small crime to henceforth estimate his belongings at 60 per cent of their "wrecking value" only.

Taxes as a Lever to Industry.

No business is more beneficial to our country than conservative forestry. Its influence on public health and on water regulation is recognized. Millions of acres of national soil, too poor and too rough for agricultural use, will be barren unless they are used for the production of forest crops. Still we continue, by preposterous taxation, to rob the business of a chance to be remunerative.

By proper taxation (direct or indirect taxation) the people can encourage desirable industries (f. i., cotton industry by import duties on foreign manufactures); by heavy taxation, they can restrain undesirable productions (f. ii, the production of alcoholic beverages). By heavy taxation they have been killing the development of conservative forestry.

In many a case, notably in the Lake States, short-sighted tax assessors, helped by foolish legislation, have compelled the wood owner to prematurely destroy the forest and to abandon the denuded land.

The forestry question is a State question and not a county question. Forest taxation should be handled by State officers, and not by county politicians.

The Principle of Taxation.

Why do we pay taxes anyhow? My "Hand Book on Political Economy" states: "Taxes on property are meant to reimburse a political organization (State, county, town) for protection of property." Does the State or the county or the town protect forest property from forest fires, from timber thieves, from squatters, from hunters and fishermen trespassing on the ground? We all know that forest property lies practically unprotected unless it be protected at the owner's expense. There are laws enough in the statute book, but there is no governmental staff charged with enforcing them.

Who shall pay taxes? Again my "Hand Book" answers: "Direct taxes are levied from the person benefited by his connection with a taxable object." We all know that the people are benefited by the mere existence of forests, and that the public welfare is closely connected with them. Still, the so-called "owner" bears the tax burden alone.

Remedies.

Forest land unfit for the plough and freed from hyper-mature timber should, in my opinion, not be held to pay any State taxes.

As the woodland county cannot get along without forestal taxation, a rebate or release on county taxes will have to be paid out of the State treasury.

Another arrangement may deserve consideration: Have the State advance all county taxes due on woodlands owned by private individuals, and have the wood owner reimburse the State at a time at which the mature timber is ready for the axe.

Immediate action is required, if the permanency of private forests is to be secured.

Forest property is unprotected, is used by everybody, is badly taxed. No wonder that good business men are averse to engaging in forestry! If the people want forestry, they can either practice it on their own account, or else must allow private forestry to be a remunerative and safe investment.

A HAZY MORNING.

Beginnings of Professional Forestry in the Adirondacks.

By B. E. FERNOW, Director New York State College of Forestry.

LOGGING CAMP OFFICE AT FORESTERS.

THE law establishing the New York State College of Forestry requires the management of the forest property placed at its disposal "with a view of obtaining and imparting knowledge concerning the scientific management and use of forests, their regulation and administration, the production, harvesting and reproduction of woodcrops and earning a revenue therefrom."

During the short time during which the College Forest has been under control of the College, naturally not much new knowledge has been obtained in the directions indicated. It will, however, be interesting enough to record at least the manner in which the problem has been attacked, the first considerations that enter into its solution, and the progress which has been made in these first beginnings in the United States of a professional and scientific management of a forest property under State control.

At the same time it will be of interest to place on permanent record also the beginnings of professional teaching of forestry at Cornell University. This record, it is hoped, will be gratifying to the citizens of the State of New York, for whose

benefit the College and College Forest was, in the main, established in view of the interests of the State in the proper use of its Adirondack and Catskill Forest reserve.

The object of presenting to the public the condition of this experiment will probably be best accomplished, without going into too much detail, by reprinting the contents of the first two reports of the Director, prepared for the Legislature, thus placing them within reach of a larger number in the form of this bulletin.

By way of accentuating some of the contents of these reports, it appears desirable to preface the same by a discussion of three essential points, which have been merely alluded to in the body of the reports, namely:

1. That applied forestry is a business for the purpose of producing values for the future rather than the present.

2. That forestry, therefore, and for other reasons, is peculiarly a business for the State, and does not usually recommend itself to private enterprise, except under special conditions.

3. That forestry is based upon the recognition and application of natural and economic principles and laws, which are applicable in all parts of the world alike, with such modifications as the different economic conditions necessitate.

Forestry a Business.

It is hoped that it will appear clearly from the perusal of these pages that forestry is not only an art, but a business. The art consists in growing the crop, the business consists in growing the crop most economically, and in finding a market for it where it can be sold with profit.

As in all other producing business, the market question is, therefore, the first and foremost one to be settled. For if the crop cannot be marketed, it is useless to grow it, and we may leave it to nature to provide the forest cover — and finally it must bring a profit, be it large or small, direct or indirect, but a profit, or else the object of forestry is not attained.

It will be apparent from this statement to every intelligent man that such a business, the management of a forest property, cannot be carried on without consideration of the business conditions immediately surrounding the particular property. Hence it is also self-evident that the procedures which are correct under one set of conditions may not at all recommend themselves under another set of conditions.

For instance, what may be proper to do in Germany or in India may not be proper to do in the United States, if business results are looked for. Again, what the State with its long life and farther reaching interests and providential functions may do

with its property, although perfectly sound from its standpoint, may not at all recommend itself and would be faulty for the private owner. In Germany, the fact that all portions of a forest crop, from the root to the brushwood, are salable in most sections, owing to the density of the population, makes possible the use of methods in the conduct of the business of forest cropping which, in our more or less unsettled conditions, are impracticable.

As long as we have an abundance of superior material from nature's forests to draw upon, we shall be inclined to leave the inferior material, inferior species and inferior sizes unused. This condition of the market for the crop must hamper not only the business part of the management, but also the silvicultural part, that which is concerned in the production and reproduction of the crop. For, with tree weeds and inferior competitors to contend with, which cannot be removed without expense, the young crop is necessarily not developing as it should and could, were the competition removed.

The forester must finally be a lumberman. The difference between the lumberman and the forester is like that between the berry picker in the wild woods and the market gardener who grows his berries with skill. The essential difference between the logger's practice and the forester's practice in utilizing the crop which nature in the virgin woods has grown without regard to man's particular needs, is that the former culls the virgin woods of the valuable portion, without regard to the replacement of the old by the young crop, while the latter's business is to perform his logging so as to secure not only a new crop, but a better crop of the useful species, and thus leave his property in better condition for the future.

This means, financially, a handicap on the forester every time. He must either leave something that he might have taken and turned into cash; or, in order to give his young crop a chance for developing, he must take out what does not pay; at any rate, he must log with care for his young crop, which means expense beyond that which the ordinary logger incurs. Perhaps he must even plant his new crop and that means direct expense. In other words, however you may turn it, the application of forestry does not increase, but always decreases present possible profits. The logger unquestionably, if properly equipped and conducting his business intelligently, always makes more present profit than the forester, intent on replacing a crop, can possibly expect to secure.

It is, then, not for the present, but for the future, that the forester's business is concerned. He must forego present profits or must even spend additional investment for the sake of a future revenue, possibly, to be sure, superior to the one he might have drawn by mere logging at present.

The crop which the forester grows is harvested many years after it started to grow. He has, therefore, to deal with a distant future, when prices for his material and economic conditions in its market and use may have changed.

He, therefore, who is called upon to advise on the management of a forest property must always weigh present and future interests, and whoever engages in this business must realize the fact that it pays, if it pays at all, only in the long run; that the advantage in the future is to be obtained only by a sacrifice in the present. The amount of sacrifice can be gauged, to be sure, within certain limits; "the dead work" to be done for the improvement of the property may be curtailed to the minimum, but in proportion the desirable condition of the property and the future advantage will be delayed.

The future, then, being such a prominent factor in the business, it would appear a natural inference that it is mainly a business for the State or other long-lived institution or continued interest. The State can wait for the time when the expenditures or sacrifices of the present bring their returns and can expend in the present on improvements which promise returns even in a distant future. The State has also the additional interest which comes from the protective quality of the forest when situated on mountain slopes, sand dunes, etc., which may make expenditure without money returns defensible.

Next to the State, the smaller communities, having similar interests, and being continuous persons, may well own such forest properties and may manage them with the future in view.

Similarly, corporations of a lasting nature and large capitalists may carry on forestry as a business, with a view to continuous profitable employment of their capital.

The large capitalist, who seeks safety and continuity of investment rather than high interest rates, if applying forestry principles to a large property may find satisfaction. For the size of the forest property has an unusual influence upon the possibility of profitable forest management, when the expenditures on dead work in one portion may be balanced by the income from the other portions. Indeed, that the German forest administrations are profitable is very largely owing to this fact that they are carried on upon a very large scale (500,000 to 6,000,000 acres), when this balancing of unprofitable and profitable working secures a more or less satisfactory result. Only under particularly favorable conditions and upon favorably located smaller properties can forestry as a business be carried on independently and with success.

For small capitalists and on small areas, as a rule, forestry as an independent business is impracticable, although it can be carried on as a side business.

The farmer, who is occupied most of the year in other employment, can very well afford, incidentally, to pay attention to his wood-lot, to put in for improvement of this part of his property an occasional day, and make a paying adjunct to his business.

The owner of a game preserve or a park property may, from time to time, intermittently or continuously, in addition to his pleasure, secure such portions of his forest crop as becomes salable, and apply the silvicultural art, incidentally carrying on the business of wood-cropping.

In the end, however, the large market which, in the United States, calls for a round 40,000,000,000 feet of lumber of various description annually, of which three-quarters is of coniferous wood, that cannot be grown in less than seventy-five to one hundred years or more from seeding, must be supplied mainly by the large operators before mentioned.

Forestry a Cosmopolitan Art.

From the statement that the difference of business conditions in Germany and the United States do not permit a direct transfer of German forestry methods to American conditions, it must not be argued that we cannot learn much from Germany. Quite the contrary is true, and those who have asserted that "American" forestry must differ radically from "German" forestry overlook the fact that, while business methods may vary, the fundamental principles which underlie the technique as well as the business methods remain the same in all parts of the world.

A College or University is, supposedly, a place where sciences and arts are studied and taught, not according to limited patriotic lines and limitations, but in their broadest, world-wide bearing, so that the student may become fit to build out or apply the same under whatever circumstances he may be placed.

That the sciences of mathematics, of chemistry, of physics, of botany, zoology, and geology do not owe any allegiance to a particular country has long been recognized; but the arts, because they exhibit varying forms in various countries, have appeared, more or less, to lack cosmopolitan character to those who are unable to recognize the laws of science, of which the arts are, ultimately, the formal expression by man — varying, to be sure, with the conditions under which they are applied.

It is true that we have not recognized and formulated all the laws of nature, and hence, for instance, the medical art has relied and often still relies upon empiricism in lieu of science.

The economic arts have suffered especially for lack of scientific basis, largely, we

believe, because that same improper patriotism, referred to above, has for a long time clouded the minds of many teachers and students of economics. Nevertheless, the present generation of them will agree that political economy or economics is based upon laws and principles which can be deduced from the various forms of their application in all parts of the world.

Different economic conditions will, naturally, necessitate a different form or method of application; but it is only in this difference of method that the arts vary in the different countries, not in essentials.

READY FOR THE FRESHET AT AMPERSAND CREEK.

Applying these general remarks to our particular subject, forestry, whether practised in Germany, in India, or in America, must exhibit certain laws and principles, which can be deduced and formulated.

Now forestry is one of the economic arts, which relies, on the one hand, upon immutable natural laws in the production of its crop and, on the other hand,— in the conduct of its business portion,— upon economic laws, which are also immutable, although less readily recognized, since they cannot be so readily tested as can the natural laws, and their recognition requires judgment.

When it comes to teaching an art, it would appear natural to find out where this art has been most highly developed, and demonstrate the principles and laws underlying the practice of that country, pointing out differences which different conditions provoke.

Thus, since the art of music has found its highest expression in Italy and Germany, it is customary to study this art by the guidance of the art of these countries; when architecture is concerned, old Greece and Italy and modern France furnish models.

Forestry is a Teutonic art; it has been developed in Germany for more than two centuries, and the literature on the subject is almost entirely confined to the language of that country, with France a second. It is, therefore, natural and proper for teacher and practitioner to study the practices of those countries, in order to find the principles and laws underlying them, and, if he have judgment, apply them, under different sets of conditions, with that modification which these conditions require.

For the United States it may still be asserted that practically the art of forestry is not yet in existence. For this reason, the patriot whose fond dream it is to teach or practice "American" forestry will find it hard to prove the birthright of his art.

Trees grow and develop under natural laws. These laws have been studied in Germany more closely than elsewhere for a century, and it is not likely that we shall find them different in the United States, nor that we shall quickly find methods of growing and planting them that have not been tried in that country.

Business principles have also been studied by the business world of Europe, and while the manner of their application varies somewhat in different countries, the principles remain the same. And it is principles mainly that a college is called upon to teach.

We come, then, to the conclusion that, while it would be folly to advocate the methods applied in the more developed and economically different conditions of Germany, and especially in their governmental administrations, only the man who is thoroughly familiar with their practices can claim to be an accomplished forester, just as nobody would be considered an accomplished musician who is unfamiliar with German composers.

This College of Forestry, therefore, will continue to teach the immutable laws and principles which underlie forestry wherever practised, but, in its management of the College Forest, will adapt these principles to the conditions surrounding the problem. This we conceive to be the true American spirit.

* * * * * * * * * *

From First Annual Report (1899):

Students, Teaching Force and Courses.

No special effort having been made to advertise the existence of this entirely novel institution, the number of students registered as regular students of the College in the first year has been small — namely, one in the freshman class, one in the sophomore class, and two in the junior class of the four-year course.

This does not, however, comprise the students who actually attended the forestry courses of the College, for through the first term thirty-one took advantage of the three forestry courses that were given during the term and in the four forestry courses of the second term sixteen, eight, six and five students respectively were entered, or, excluding duplication of names in the four different courses, twenty-six students were pursuing professional courses of the junior year, besides the two freshmen and sophomore students of the college.

These additional students have come mainly from the Department of Political Economy and from the Colleges of Engineering and of Agriculture. Of the latter a number have expressed their desire, after graduating from the College of Agriculture, to complete the full course of the College of Forestry, with a view of graduating. The fact that no entrance fees are required in the College of Agriculture, while in the College of Forestry for all except students from the State of New York such fees are exacted, seems to have suggested this arrangement.

The combination of the two courses is undoubtedly to be encouraged, since managers of forest properties will often be called upon to employ agricultural knowledge, while farm estates have almost invariably smaller or larger forest properties attached.

Of the four regularly inscribed students, two were from the State of New York and two from the State of Illinois.

In the absence of sufficient appropriations and in view of the probability that the full complement of the teaching force, as provided by law, would not be required at once, no registry for senior year studies being anticipated, only one instructor was appointed in the person of Assistant Professor Filibert Roth. For similar reasons the position of forest manager was combined temporarily with that of the assistant professor, and no other assistant or employes have been installed, excepting a stenographer and clerk, who is paid by the hour of actual service.

In addition to the regular courses on timberphysics, in which ten students of engineering and one student of forestry received instructions during the first term, Assistant Professor Roth was called upon to give three lectures on "Wood as a

Material of Construction" to the large class of junior students of Sibley College in the course on Materials of Engineering; also one lecture on "Fireproofing of Wood" to the Seminary in Marine Engineering and one lecture on the "Strength of Wood and Timber Testing" to a class in Sibley College; also one lecture to a botanical seminary on the practical questions in regard to fungus diseases of wood.

The literary facilities have been amply provided for. A library of works on forestry and allied sciences, comprising the leading works in English, French and German languages, has been purchased, containing nearly 500 numbers, and has been incorporated in the general library; the books bearing, however, a distinguishing stamp, which designates them as property of the State College of Forestry. The leading German, French and English forestry journals and some of the lumbermen's journals are to be found in the reading room of the library.

Some of the courses which are desirable for students of forestry, and have been tentatively announced in the schedule of the studies, are as yet not provided for.

A course on business law most desirable for a forest manager it was hoped might be instituted by the authorities of the College of Law, but upon consultation it appeared that the faculty is fully occupied, and will not, without additional assistance, be able to provide such a course.

There are no provisions for the courses on pisciculture and venery, two subjects — the taking care of fish and game — which are often intimately connected with the business of a forest manager, and in fact are combined with the Fish, Game and Forest Commission of the State. The professor in charge of the department of zoology regrets that he has no assistant versed in economic or field zoology competent to give such courses.*

The present appropriation of $10,000 is hardly sufficient for the running of the College, when all the demonstration material is still to be provided. An increase to $12,000 is desirable, which, it is believed, will for a long time suffice annually to conduct the College in a satisfactory manner.

Publications.

Besides the announcements of the courses instituted in the College of Forestry, there has been published under the provisions of section 2 of the law establishing the College, Bulletin No. 1, describing the aims and objects of the College and the methods in general which are to be applied in the College Forest. In addition a circular letter has been sent through the Department of University Extension for

* Both these courses are now provided, see future pages.

Agricultural Knowledge to the farmers of the State, inviting them to secure by correspondence or otherwise the benefits which this State College may be able to give them by advice in managing their woodlots.

Accommodations.

Outside of an office for the Director, the College has begun its work without any adequate quarters.

Through the courtesy of the Director of Sibley College, Professor Roth has found temporary location in the testing laboratory of that college. The room assigned has from the start proved too small to accommodate even the small number of students that an entirely new course attracts, and several applicants for admission to the course on timberphysics had to be turned away for lack of accommodations.

The Director has for his lecture courses been allowed to share the room of the Professor of Political Economy, a room not at all adapted to laboratory work such as now required.

The laboratory facilities of the botanical department, kindly placed at the disposal of the Director, being cramped and, for the larger part of the available time occupied by that department, have not been of avail.

For such work as requires the handling of plants and soil, the Professor of Horticulture has offered the use of the forcing house.

It must be evident that the first requirement for the College is its housing. The absence of convenient and permanent lecture and laboratory rooms necessarily retards the proper development of the College and is discouraging to both students and professors. In the absence of proper storage and shop rooms it has not been practical to begin with the collection of the necessary demonstration material, without which instruction can only be partially successful.

The College Forest.

The demonstration area to be set aside for the use of the College in the Adirondacks was selected by the writer in midsummer after careful inspection of the available tracts, but owing to various delays it was not finally turned over to the College by the Forest Preserve Board when the first report was written.

It was, therefore, impossible to report even plans for its management with any definiteness except as has been done in a general way in Bulletin No. 1. Only what the needs of such a management will be in general may be foreseen, and it can be pointed out at once that the present small appropriation, which does not suffice for

the conduct of the College alone, is entirely insufficient for the organizing and managing of the forest property.

While it is anticipated that the financial results from this property will not only pay for its management but yield a satisfactory interest charge on the investment, a working capital with which to begin is as necessary as in the conduct of any other business.

Even a lumberman who treats his forest property as a speculation and exploits the forest only once without regard to a future use of the same cannot dispense with such a working capital with which to prepare for his logging operations.

The forester, whose business it is not only to exploit the forest once, but to so manage his property that he may continuously harvest and reproduce, to treat the property as a permanent investment and conduct a continuous revenue-producing business, must have even a larger working capital with which to start, if he is to make a success of his business. It may be roughly estimated that between one and two million feet of logs and from five to ten thousand cords of wood will be the annual growth of the 30,000 acres. This material has to be cut and marketed annually in order to keep up a well-regulated forestry system and secure satisfactory reproduction. This harvesting of the crop might be done under contracts with lumbermen, and some of it may best be done in that manner, but it would be highly undesirable to be entirely dependent upon this method of disposal, which would entail a considerable amount of watching, friction and dissatisfaction. Moreover, in lumbering under forestry methods, a large amount of "dead work"— unprofitable for the moment, profitable only in the end — will have to be done which it will be difficult to secure from contractors, and which would at least prove unnecessarily expensive, if done in that form.

Especially in a "demonstration or experimental" forest the dependence upon contract methods must prove detrimental.

The first requirement is to prepare the property for permanent use in the business of forest cropping. That means, besides a survey, stock-taking and preparation of working plans, to make the property as soon as possible accessible in all its parts, so that the fellings can be most advantageously distributed over the area. Roads of a more permanent character than those with which the lumberman is satisfied must be built, and other means of transporting materials at will at any time must be provided. Nurseries to supply plant material for such portions as require planting must be established. Planting of waste and burnt-over areas must be performed, and improvements of all kinds, which entail expenditures at present for the sake of higher efficiency in revenues in the future, are required.

These needs have evidently not been foreseen in the law establishing the College Forest. The present law, in section 7, requires that "all sums received by the University for the sale of timber or otherwise under this act shall be immediately paid to the State Treasurer and credited to the fund appropriated from time to time for the purpose of this act."

The evident intention of the law appears to be that a portion of the gross receipts are to be reappropriated; but an initial appropriation at least is unavoidable to enable the beginning of operations and make them independent of a complicated contract system, in which the necessary work performed on roads, waterways, planting, etc., may be taken as part payment for the material sold. It will also then be a wise policy to determine beforehand for a number of years the proportion of gross revenue which may best be applied to the management and improvement of the property and make it available in general terms. In this way the management is put on its mettle, as it were, increasing its means by its own exertions, and enabled to enter upon a policy of improvement of at least a few years' duration without disturbance; a feature which, especially in forest management, will be found far superior to the policy of annual changes or reconsiderations.

I urge, therefore, the need of an initial single appropriation of not less than $30,000, which will permit at least a proper start; and, after the beginning is made, such arrangement as will permit a certain percentage of the gross income, with or without special or direct appropriation, to be used for the administration of the property.

In European forest administration the expenditures represent from 40 to 60 per cent. of the gross income, the lower figure prevailing in the most highly developed and most intensively managed smaller states. In Bavaria the expenditures are now 50 per cent. of the gross income, while Prussia, with the largest undeveloped area and necessarily least intensive management, approaches the 60 per cent. limit. In this connection it is also of interest to see that the net results are increased in proportion to the expenditures. Thus, Prussia, when spending $1.33 per acre received a net revenue of 96 cents per acre; Bavaria, with an expenditure of $1.37, secured a net result of $1.19, and when spending, as now, $1.92, the net revenue was also $1.92; Baden, when spending $1.54, secured $2.90; Saxony with $2.50 secured $4.11, and, with an expenditure of $2.70, the net result was $4.65.

Under our conditions and especially on a single tract, serving as demonstration or experiment forest, in which all work of development must still be done, and many things are expected which in a forest merely managed for financial results can be avoided or postponed, it may be fair for a time at least, to be satisfied with a net return of 25 per cent. of the gross income, leaving 75 per cent. for expenditures.

AXTON ON THE RAQUETTE RIVER.

which would still, it is expected, make between 2 and 3 per cent. interest rate on the investment.

While it is intended to manage the property for the demonstration of financial results as well as silvicultural methods, it will of course be necessary to do many things for demonstration only which in a "business" forest would be left undone.

Character of the Property.

The area purchased is located in Franklin county, comprising the west half of Township 23, with a small parcel of 300 acres in the southeast corner of the town-

CAMP FORESTERS.

ship and so much of Township 26 east of the Raquette River as is necessary to make up the 30,000 acres.

The location appears in every respect to be as satisfactory as could be found, both as to physical and forest conditions and as to market facilities. The proximity of Tupper Lake, with its mills and two railroad terminals, promises favorable market conditions for most of the materials which will have to be disposed of.

The western boundary is only three miles from Tupper Lake station, and the Adirondack and St. Lawrence railway nearly touches the northwestern corner. The center of the property is approximately at Axton, thirteen miles from Tupper Lake, and is reached by a good country road, or else is twenty-two miles by the navigable

Raquette River, which continues navigable to Raquette Falls, halfway to the southern boundary of the property.

Centrally located at Axton, accessible, as described, by road and river, and also within a four-mile drive from the steamboat landing of Lower Saranac Lake, is a fully equipped establishment of dwelling houses and outbuildings, where the forest manager may be located and where classes of students may be accommodated during summer courses, a farm of 200 acres furnishing a desirable basis for logging operations, for the establishment of nurseries, etc.

The topography of the property is varied so as to offer opportunity of demonstrating various modes of treatment — high elevations, slopes of varying aspect, valleys and river bottom lands being represented.

Less than one-half the property is virgin timber, the other half more or less culled of pine and spruce, a small portion burned-over lands, where artificial reforestation may be practised.

A water power of eighty feet fall, in which a quarter interest goes with the property, may offer opportunity for establishing small wood manufactures to use up inferior wood materials usually wasted.

The property has been secured at a very reasonable price ($165,000), and appears desirable in every respect for the purpose which it is to serve.

As soon as the property is turned over to the College and the weather permits, it is proposed to make a forest survey and ascertain the amount of timber standing and the annual growth, as a basis for working plans and to determine the amount of material which should be cut annually. For this purpose a small amount of the original appropriation of $10,000 has been reserved. Active operations in laying out roads, in establishing nurseries and beginning logging operations will have to wait until other appropriations become available.

The following disbursements have been made for the quarter year:

Salaries,	$2,666 64	
Clerical assistance,	37 70	
Library and demonstration objects,	463 88	
Office fittings,	212 33	
Stationery, printing, postage, telegraph and express,	273 03	
Contingencies, traveling expenses,	677 59	
Nursery work and forest expenses,	24 50	
		$4,355 67
Balance remaining unexpended,		5,644 33
		$10,000 00

Briefly summarized, the needs of the College and demonstration forest are:

1. Sufficient and suitable rooms for conducting the courses of the College, for which a building 50 x 100 feet, two stories and a basement, were best provided.

2. An appropriation of $12,000 for the College alone.

3. An appropriation of $30,000 to place the demonstration forest on a proper basis at once.

4. Such legislation as will make the demonstration forest self-supporting by permitting a certain proportion of the gross income to be applied to maintenance, improvement and administration.

It is hoped that this report sets forth, with sufficient clearness for the consideration of the Legislature, these immediate needs for this new educational institution, which is the first of its kind in the United States — a testimony of the wise foresight and statesmanship of the people of the State of New York.

Having recognized the need of a proper forest policy in the establishment of the Adirondack Reserve, and the further need of educational means to secure rational forest management by the establishment of this College, it remains to place the latter upon an adequate and stable basis worthy of the Empire State.

From Second Annual Report (1900):

In order to bring the College into useful relation with the farming community, the following circular letter was sent out by the Bureau of University Extension of Agriculture to over 10,000 farmers, with the result of a frequent appeal for advice:

To the Farmers of the State of New York:

The Legislature of the State of New York provided at its last session for a College of Forestry in connection with Cornell University.

The object of this College is to teach all that is necessary to a forester. A forester is a man who knows how to secure the largest continuous revenue out of a forest.

He knows how to cut the old timber so as to reproduce, not a waste but a new timber crop of value, better than the original virgin growth, without the necessity of planting it. He also knows how to plant and care for a woodcrop so as to produce the best results.

While in the first place a forester, educated at a college, is to be a man who is fit and capable of managing a large timber estate for the production of lumber for the market, some of the knowledge which he must possess is also useful to the owner of a small woodlot, namely, all the knowledge which we call silviculture, the

art of treating a woodlot so that it will reproduce only the better kinds and will grow the largest amount of the most useful wood.

To demonstrate how forestry is practised on a large scale the State has provided the College with a forest area of 30,000 acres situated in the Adirondacks. This will be an object lesson mainly to the lumbermen and owners of large timber properties, the State with its Adirondack park included.

But it is also the intention to benefit the farmer who owns a woodlot by such information as the College may be able to give, not only to those who come here to attend some of the courses of the College, but to those who may wish to have any questions answered by letter or by printed bulletins, which it is proposed to issue from time to time.

Those wishing to avail themselves of this opportunity are invited to correspond with the undersigned, sending their addresses and stating what particular interest they have in the subject and whether they desire bulletins sent them.

Yours, for more rational use of the woodlot,

B. E. FERNOW,

Director.

Students, Teaching Force and Courses.

A gratifying increase in the number of students is to be recorded from the four who were reported as registered in the first term of the institution, the number now being seventeen, namely:

1	senior,
4	juniors,
1	sophomore,
5	freshmen,
6	special students.

Two freshmen, who were registered additionally, were excused early in the fall term on account of insufficient preparation. Of these students, eight, coming from the State of New York, receive their tuition free. The other students come, two from Illinois, and one each from Maryland, Michigan, Missouri, North Carolina, Ohio, Pennsylvania and Russia. Four of these are graduates of other colleges.

In addition, students of other departments of the University, namely, of the Colleges of Architecture, Civil Engineering, and of Agriculture, have attended some

of the courses in the College of Forestry, so that all registrations in the different courses during the fall term numbered fifty-nine; or, allowing for duplication of names in different courses, forty-five students have, during the fall term just passed, benefited from the establishment of the College.

It is gratifying to state that the College of Architecture has made the course in Timber Physics, given by Professor Roth, obligatory, while the College of Agriculture makes a course in Silviculture, given by Professor Gifford, a required course for its students.

The Faculty has been completed as prescribed by the organic law through the appointment of Dr. John Gifford as Assistant Professor. Professor Gifford, who, having studied forestry abroad, received the degree of D.ŒC. from the University of Munich, was well known before by his forestry work for the New Jersey Geological Survey, and as originator of "The Forester," the present organ of the American Forestry Association. Dr. Gifford was elected Secretary of the Faculty and Custodian of Collections.

Professor Roth has continued to act as forest manager, devoting his entire time to the work on the College Forest through the spring and summer, without vacation. During the fall term, in addition to his lecture courses at the University, he has superintended the work in the woods by occasional visits.

Regarding the courses, I may reiterate that, while it will be the aim of the Faculty to furnish a high-grade professional instruction in all the Forestry branches which have been differentiated in the best European forestry schools, care is also taken to adapt the teaching to American requirements. Besides the full four-year course leading to the degree (B.S.F.), special students, if only sufficiently prepared, are allowed to elect any courses they may choose.

In addition to the regular instruction, as the existence of the College becomes known, there is growing a crop of inquirers who seek advice by letter, entailing a considerable correspondence on the part of the Director. These inquiries may finally be met by printed matter, for the preparation of which, so far, leisure has been lacking.

The question has been often raised what we may learn in the matter of forestry from Germany, where forestry has been practised for centuries. Briefly, we can learn from their practice the principles underlying it. Whatever may be said of methods of procedure or of administration, the principles underlying are not national but biological and universal. There are two main branches of forestry. The most important branch, silviculture, is based on the recognition and application of natural laws, which are the same the world over. The other important branch, forest regu-

lation, is based on the knowledge and use of mathematical and economic laws and principles, which are also of world-wide application, albeit the economist has not always succeeded in recognizing the law; nor has the naturalist always been successful in this respect.

The methods of applying laws and principles may vary, and to derive practical methods for their application requires judgment of the conditions surrounding the problem, which comes by experience, not by teaching. He who has thoroughly grasped the laws and principles, natural, mathematical and economic, which underlie the well-developed forestry practices of Germany, if he have judgment, will be able to devise practical methods applicable to any conditions on the globe; and, in order to do so successfully in America, he must be thoroughly cognizant of American economic conditions.

It is only the half-informed who expects to apply the recipes he sees employed, without a diagnosis of the case; it is the injudicious who would copy the practices of another country without the modifications which a new country make necessary.

The main effort in the teaching of the College, therefore, is to point out the unalterable principles and laws underlying the varied practice.

Practical Instruction in the Forest.

The most notable change in the schedule of the College is the arrangement by which the junior and senior classes are, for the entire spring term, to be transferred to the College Forest, where, under the guidance of the assistant professors and Director, they will be engaged mainly in practical work. This is to consist in sowing and planting in the nursery and in the field, making improvement cuttings and thinnings, marking out regeneration cuttings, and performing other silvicultural operations, measuring trees, making yield tables, surveying, subdividing, laying out roads, and making working plans for limited areas.

During this term in the woods a course in practical fish culture will be given, for which, in the coming spring, Professor B. W. Evermann, the expert of the United States Fish Commission, has been engaged, while a course in game preservation will be given by Dr. Gifford.

As a preparation to these courses, a special course on the morphology and classification of fishes, birds and mammals has been kindly devised by the Zoological Department, which course has been most satisfactorily given by Mr. H. D. Reed, B.S.

It is expected that this opportunity for practical work in the woods, continu-

ously through a whole term, after the theoretical knowledge has been acquired, will prove of greatest benefit to the students. The students will pay their board at a moderate rate in the College Forest at Axton, where a simple dormitory is to be built, the present accommodations being insufficient.

The course on business law which it is hoped to secure, as most desirable, not only for students of forestry, but other professions in which a knowledge of the principles of contract law, real estate and criminal procedure is required, has not as yet been instituted, owing to the inability of the College of Law to provide the same. Permission, however, was kindly granted by the College of Law to students of the College of Forestry to attend the regular course on contract law.

Accommodations.

The accommodations for the College have been somewhat improved, since my last report, by the assignment of two rooms, a larger one in a flimsy wooden building for Professor Roth's wood laboratory, a smaller one in the basement of another building for the housing of demonstration material and collections, while the Director occupies cramped quarters in a third building.

Considering the crowded condition of the University in many, if not all, of its departments, even this insufficient and unsatisfactory housing of this State institution must be gratefully accepted as real generosity, for which the University secures but small returns in the prestige of administering the College.

I can only repeat with more emphasis that "the absence of convenient and permanent lecture and laboratory rooms retards the proper development of the College and is discouraging both to students and professors."

An adequate building worthy of an institution which the great Empire State sees fit to maintain is the foremost requirement now, since the College is otherwise fairly established.

A building 50 x 100 feet, two stories and basement, will probably be for all time sufficient to accommodate the College, and may be built in good style and adequately fitted out with an expenditure not exceeding $50,000. It should be built without delay.

The College Forest.

On the first day of March, 1899, the Trustees of Cornell University took charge of the property which is to serve as demonstration forest to the College of Forestry, the purchase having been completed and the deed dated but not delivered from the grantors, the Santa Clara Lumber Company, to the Trustees of the University on the

twenty-first day of December, 1898. The deed was recorded in Book 108, page 53 ff., in the Recorder's office of Franklin county, the duplicate and original copies being deposited with the State Department and the Forest Preserve Board respectively.

The purchase, including determination of price ($165,000) and formulating of deed, was negotiated entirely by the Forest Preserve Board, without any voice on the part of the Trustees in whom the title is vested, except as to the selection of the tract. The selection of the tract was made by the writer after examination of all the available tracts offered, special regard being had to the accessibility to market and to the public, besides the physical character.

Title and Proprietary Rights.

The conditions of the ownership are expressed in the law prescribing the purchase, Chapter 122, Laws of 1898, as follows:

"For the purposes of such school and for carrying out the objects of this act, the Board of Trustees of said University are hereby authorized and empowered, by and with the consent and approval and under the direction of the Forest Preserve Board of this State, to contract for the purchase of, and to purchase and acquire by purchase title to not more than thirty thousand acres of land in the Adirondack forests. The University shall have the title, possession, management and control of such land, and by its Board of Trustees through the aforesaid College of Forestry shall conduct upon said land such experiments in forestry as it may deem most advantageous to the interests of the State and the advancement of the science of forestry, and may plant, raise, cut and sell timber of such species and quantities and in such manner as it may deem best, with a view to obtaining and imparting knowledge concerning the scientific management and use of forests, their regulation and administration, the production, harvesting and reproducing of wood crops and earning a revenue * * *.

"Every deed or conveyance of lands acquired under the provisions of this act by said University shall contain in the habendum clause thereof a condition and covenant that the same, and the title to the land conveyed therein and thereby, is taken by the grantee therein named, the Cornell University, under and pursuant to the provisions of this act, and shall also contain an express covenant running with the land and binding upon said University, that the same is conveyed for the uses and purposes in this act provided for, and also an express covenant on the part of said University to convey said lands to the people of the State as hereinafter provided for * * *.

STUDENT MEASURING TREES.

DRIVING THE SPRUCE TO MARKET—RAQUETTE RIVER.

"Upon and at the expiration of thirty years from and after the taking effect of this act all lands and each and every part and parcel thereof, purchased by said University, and paid for by the State under and pursuant to the provisions of this act, shall be by the Board of Trustees of said University, or its successors, granted and conveyed to the people of the State of New York by a good and sufficient deed of conveyance, without further price or consideration therefor, and the same shall thereupon be and become a part of the Forest Preserve * * *."

A boundary survey was begun by the College of Forestry in early June, the State Engineer and Surveyor, who, under the law (Chapter 122, 1898, § 3), was required to do so, not being able to comply with the requirement on account of absence of funds appropriated for such a purpose. Later, however, such funds were found by the Forest Preserve Board and the boundary survey was finished by the State Engineer, the portions of the survey made by the College being accepted by the State Engineer.

No difficulties or contentions as to proprietary rights were encountered, except a squatter's claim on some forty acres of cleared land at Sweeney Carry, Raquette River, which seems to be without legal basis, and requisition for his removal, peaceable if possible, has been made on the grantors.

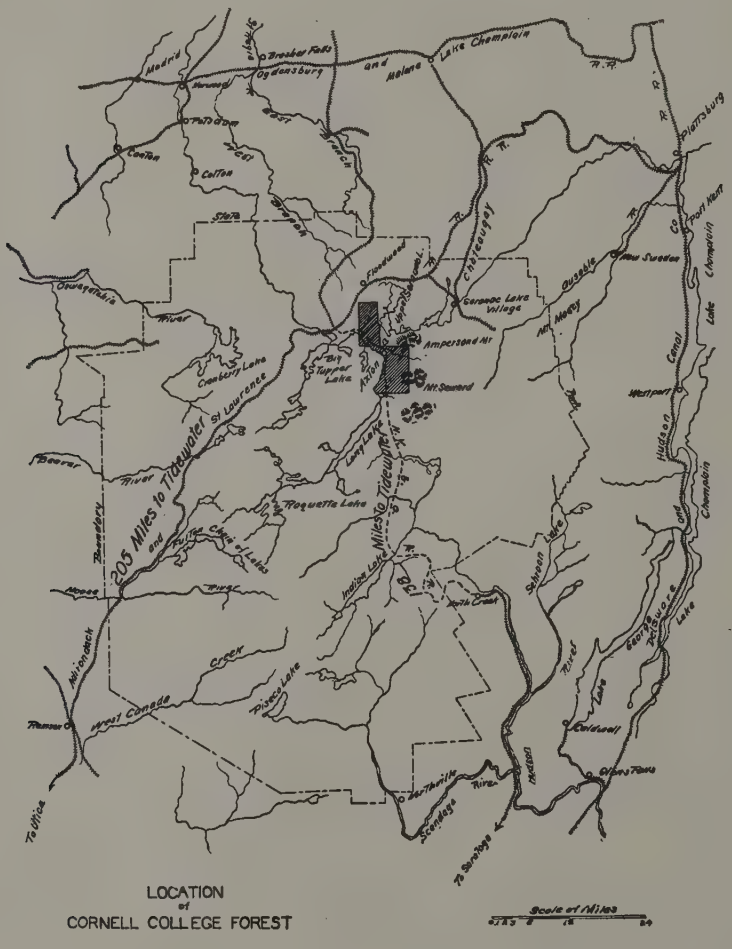
In addition to the acreage, there goes with the property one-quarter undivided interest in so much of 1,333.44 acres near Raquette Falls as is situated on the east side of Raquette River. It is evident that the eventual extinguishment of the three-quarter foreign interest in the falls will greatly improve the situation for this part of the property.

A right of way for railroad purposes, following largely the valley of the Raquette River, is also excepted. This projected railroad — the continuation from Tupper Lake of the New York and Ottawa Railroad, proposing to connect at North Creek with the Adirondack Railroad, and making a short line through to eastern ports — has, unfortunately, by the short-sighted policy of the State, enjoined in the Constitution, in not permitting State lands to be granted for such purposes, been prevented from being built, thereby hampering considerably the development of the College Forest.

As will be shown farther on, a successful forestry system requires the cheap transportation of wood materials. The slaughter and uneconomical treatment of the forest, with which the lumbermen have been charged, is, to a large extent, a necessity, as long as such cheap transportation for the inferior materials cannot be had. A really satisfactory forest management depends as much upon market facilities as any other producing business.

Location.

The location of the property was briefly described in my last report, and may be seen more clearly in the accompanying sketch map, in which especially the relation to market appears. A more detailed description of the property will form the subject of a special report when the results of the forest survey, made during the summer



and fall, but not quite completed, shall have been compiled. The detailed plans of management will also have to be deferred until that time. At present only the general policy, which, after a study of the situation, has appeared desirable, may be outlined.

General Policy.

The property is to belong to Cornell University, and is to serve for experiment and demonstration purposes to the College of Forestry for thirty years. Hence it would appear appropriate to plan all work for a period not exceeding that length of time, so that at the end of the period the property may be returned to the State in an improved condition, having meanwhile served its purpose.

There being no distinct policy or character of demonstration or experiment prescribed by the law establishing the College Forest, except the general injunction to apply forestry principles and methods in its management, it becomes necessary to choose and formulate a policy from among the many possible methods of procedure.

Two objects, it would appear, were in the mind of the Legislature when connecting the management of this forest property with an educational institution, namely, that it serve as a working laboratory for the students of such College, and also that it be so managed as to secure experience, which might be applied to other forest properties and especially to the holdings of the State.

The two objects can only in part be attained simultaneously. While the methods employed and experience gathered in the management of the whole forest will, to be sure, be instructive and available for demonstration purposes, many things will have to be done additionally to fulfill the purposes of mere instruction, which, in a forest managed alone for directly practical and profitable considerations, would perhaps not be practised.

It will, therefore, be desirable to set apart certain limited portions to be treated solely with reference to the educational object. For instance, it would hardly be considered desirable in the Adirondacks to rely upon coppice management. Yet, for demonstration purposes, small areas may be treated under such a system. Or, thinnings in young woods and other silvicultural operations may be instituted where, under present business conditions, practical considerations would exclude them. The work required in these special demonstration areas will be performed as much as possible by the students themselves, under the direction of the professors, as part of their practical education during the spring terms, or at other times.

As to the second object, namely, to secure experience that may serve other forest owners and especially the State in its Adirondack Reserve, the problem may be formulated as follows: to show how a wild woods in the Adirondacks may be treated, cut and utilized, not only without impairing but actually improving the productive capacity, changing it into a more useful and better investment for the future, into a continually revenue-producing civilized forest.

Wild woods in the Adirondacks are, as a rule, composed to a large extent of kinds of trees and specimens of trees which are not the most useful; in nature, weeds have the same rights, and often better chances, than the species more valuable to man. Moreover, the virgin wild wood, if old timber, is full of trees which do not grow any more; practically, production is at a stand-still, decay offsetting growth; a dead capital, not bringing interest.

The sooner this old stock is replaced by a new, vigorously growing crop of young trees, which utilizes the soil energy to the fullest, the better must become the investment. Again, there are burnt areas, clearings and brush wastes, grown up with weeds, which are dead, unproductive capital. The sooner they are planted with a desirable crop and turned to useful production, the sooner will the investment bring its returns.

The aim and business policy, then, of the management should be within the thirty years, or sooner, as quickly as possible, to have cut all the old growth, or nearly so, giving chance for the young, volunteer growth, and otherwise reproducing a crop of superior composition, and also to plant up all the waste places.

Business Considerations.

These conditions and propositions may be aptly compared to the condition and policy of the owner of a dilapidated house, out of repair. As long as the house remains in that condition it is not only costly and useless property, but prevents useful occupation of the ground. You may sell stone and brick from it, deteriorating it further — just as the lumberman culls the useful species out of the wild woods — deteriorating them only more and more. To utilize it, to secure a continuous revenue, you must either repair it or tear it down and build it anew. In other words, you must invest more money in order to secure ultimately the best revenue from the original investment.

It is similar with the wild woods: the owner who only culls the valuable species and leaves the ground to the unsalable weeds may recover his purchase money and more, but it is at the expense of the value of his investment as a constant revenue-producer. He who wants to practise forestry must realize that that means, financially, curtailment of present revenue for the sake of continued future revenue.

The curtailment consists not only in leaving material in the woods, which might have been removed and sold; it lies in the greater expense which comes from a more carefully conducted logging operation when less material is logged from the same ground; it may consist in the expense of removing unsalable material, burning of brush, etc., or, finally, in the expenditure for planting up unproductive areas. A

NURSERY GROUND IN FOREST, WAWBEEK DISTRICT;

SHOWING CHARACTER OF TIMBER.

large amount of "dead work," not immediately, but ultimately profitable, must be done.

So much of the financial and the common sense business aspects of forestry it has seemed needful to explain, in order to counteract the wild promises of enthusiasts regarding the immediately and presently profitable application of forestry. The profits of forestry lie in the future as a result of present expenditures; the problem is to keep the expenditures within the proportion of the returns to be expected.

Unquestionably a large share of the expenditures for improvement, if not all, may be secured from the woods themselves, and eventually a surplus, a revenue, may be expected during the rebuilding of the dilapidated wild woods, when the business of cutting and marketing the old stock is fairly established.

There are a number of practical problems to be solved in carrying out this program, which can be grouped into three classes, partly, though not altogether independent. The one class refers to silvicultural methods to be pursued in reproducing the new crop, which are partly, at least with us, to be developed by experiment; the other class of problems refers to the business management.

In a private forest management, in which only the present pocket interest is to be subserved, and no allowance is made for the promises of a distant future, the individual being too short lived, mere exploitation, less crude, perhaps, than practised hitherto, seems alone practical, as asserted by some writers on the subject, with whom, however, we do not entirely agree.

The State, on the other hand, can afford to discount the future, can pay for an improvement which promises sure return of its cost with interest, even though in a distant future.

Nevertheless, even in the case of the State, it is proper policy to secure the best returns with the smallest outlay, and in such a manner that, as far as possible, present outlays find their compensation in present returns, *i. e.*, to manage economically. It would be possible to solve without difficulty and with absolute and immediate assurance of success the silvicultural problem, namely, the change from a poorly growing old woods into a thrifty young woods, if the question of expense were entirely neglected. If, however, the problem is to be solved with due consideration of business principles, such as should influence even the State, it becomes more difficult. It requires, in the first place, the possibility of marketing the crop.

This difficulty is almost entirely a transportation problem. As far as the soft woods are concerned, transportation by water is possible and cheap, and the development of the pulp industry assures a tolerably paying market now and a better one

later, even for smaller sizes, although, even with these woods, spruce, pine, etc., a certain portion must be left in the forest, entailing dead work in its disposal or detriment to the young crop. With the hardwoods, not only is the crop of marketable logs smaller and the transportation, necessarily by land, more expensive, but they produce a still larger portion which can only be used as fuelwood. From the market point of view, therefore, the disposal of the large amount of firewood is the important problem.

This problem at once affects the silvicultural problem of securing the most valuable young crop, if we wish to rely upon natural reproduction as supposedly the cheaper method.

The most valuable crop to be grown in the Adirondacks,—and, as for that, in most locations of the Northeastern United States,—and especially for the State, are the conifers. Coniferous wood represents three-quarters of the total wood consumption of this country, and there is no reason to expect a change. Spruce and white pine hold now and promise for all future to hold the most important position in the Northern market, hence their reproduction should be the main object of the forester's skill. Mixed with the hardwoods, as they originally were, the white pine, culled out as the most easily marketable wood, has been almost eradicated in the Adirondacks, because it cannot reproduce under the shade of the remaining deciduous trees and spruces; the spruce, being more tolerant of shade, has persisted in producing young growth, but by culling it out of the mixed forest, as it is culled in the usual lumberman's fashion, with the hardwoods left, not only is the development of the young spruces retarded and stunted, but in the composition of the crop it must, by necessity, take a less prominent part.

Removal of Hardwoods.

It is, then, the reduction and removal of the old hardwoods which alone assures success in the silvicultural program of re-establishing and giving advantage to the conifers. If this program be conceded as correct, then it might appear even good business policy to be satisfied if only the cost of removal of the undesirable material were covered by its sale. To find a market for the hardwoods, minor material as well as logs, is the key to the solution of the silvicultural problem: increase in the proportion of the more valuable spruce and pine.

In hardwoods, at least in the Adirondacks, the proportion of log material is much smaller than that of mere cordwood material, the latter averaging probably more than double in cubic contents of the former. The cordwood market, therefore, as stated before, is even more important than that for logs.

Under present conditions of means of transportation and in the absence of a local market, neither cordwood nor logs can be sold with the expectation of leaving a margin, unless cheap means of transportation, *i. e.*, direct railroad transportation, can be had.

It had been expected, and the tract was located with that expectation, that the extension of the New York and Ottawa Railroad from Tupper Lake would furnish that opening; but, as intimated before, the courts have denied the right of way for a portion of the road, without which it cannot be built, under the constitutional clause forbidding the taking of State lands for such purposes. The necessity, therefore, arises of constructing independently the needed railway tracks to connect with through lines, in order to market the hardwoods. Even then, while logs and the better classes of firewood may be disposed of with a slight margin of profit, the bulk of the latter would remain unsalable and its disposal, the burning of the debris after logging, would entail a disproportionate expense.

The solution of the market question, then, appears in the establishment of manufactures upon the tract, which would utilize all the wood and ship the manufactured article. The most economical use of fuelwood consists in the distillation of the same for acetic acid and wood alcohol. The most economical use of hardwood logs is in the manufacture of staves with modern machinery, when staves are made by veneer cutting, and logs down to an eight-inch diameter can be used almost to the core, making no waste beyond what is needed under the boilers. A combination of these two kinds of manufactures would insure the most economical disposal of the hardwoods. It has, therefore, been the aim of the management to secure the establishment of such manufactures on the tract.

To induce manufacturers to invest their capital in the location of plants requires not only the inducement of cheap material and low freight rates, but the assurance of a constant and continuous supply of raw material for a given time, which, in the case of bulky and heavy hardwood material, must be within short reach. To run a modern establishment profitably, its size must be large and hence the supplies required are large.

The first question a manufacturer will ask is, Can you supply my mill regularly for a sufficient number of years that will reimburse me for my plant?

It was soon found that the quantity of material that could be offered, if the cut were distributed over the entire thirty years, was not sufficient to attract such manufacturers. In other words, the tract was not large enough or not timbered well enough to supply a well-equipped plant for thirty years with both retort wood and logs. Hence it may become necessary, in order to secure such market, to shorten

the time during which the old hardwoods are to be replaced by a young crop of conifers and hardwoods.

At present writing, negotiations are pending with responsible parties for the erection of such plants, under contracts which require the furnishing for a term of years of all raw material, contingent upon the ability of the Trustees to enter upon such contracts, the contingency being dependent upon the action of the Legislature in providing the necessary continuous appropriations for working capital.

In case such contracts materialize, the most difficult question of forest management in the Adirondacks, namely, the market for hardwoods, will be solved and the attention of the Manager can be entirely devoted to the silvicultural problems, the carrying on of logging operations in such a manner that the volunteer young growth of both hardwoods and conifers may be saved and given opportunity for development, and additional spruce and pine be reproduced assisted by artificial planting wherever necessary.

The prices which are to be obtained under the contract in contemplation, although as low as the present undeveloped market conditions necessitate, must be considered very satisfactory, when it is realized that even most of the inferior limbwood becomes thereby salable and that the burden of transportation from the property to market is left to the manufacturer. The results should at least make the management self-supporting and secure the silvicultural object.

Organization.

The organization of administrative forces, so far, has remained tentative, as it seemed best, while plans were still forming, not to overburden the administration with regularly salaried employes beyond the immediate necessities.

Instead of employing a local manager, Professor Roth has added the duties of such an officer to his professorial work. He finished his work at the University early in the spring and superintended the work in the forest personally through the summer and without vacation. A competent foreman, employed by the month, who acts as superintendent, is in charge of the property, and a bookkeeper, also employed by the month, and located at Axton, is in charge of the buildings, and attends to the correspondence with the Director, and the bookkeeping for both College and College Forest. A small crew of wood choppers working by the day completes the present list of employes. The protection of the property is, so far, left in the hands of the superintendent and foreman.

This simple, inexpensive organization, in which economy is the greatest virtue,

will, of course, have to be somewhat amplified, as requirements grow. Weekly reports are forwarded to the Director by the bookkeeper, from which the progress of work and expenditures are visible. All payments are made by the Treasurer of Cornell University upon monthly vouchers prepared by the bookkeeper at Axton and checked and approved by the Director, in whose office merely a voucher record book is kept. To simplify the business, certain bills, limited in amounts, whose payment cannot be left to monthly settlement, like wages to workmen leaving the employ, are disbursed by the Director and appear in reimbursement vouchers. All expenditures are specifically authorized by apportionments of the appropriations submitted from time to time by the Director to a Forestry Council, consisting of the President, the Treasurer, one Trustee, the Director and the Manager, and approved by the Board of Trustees.

Farm and Boarding House.

There is located on the property at Axton a farm clearing of about 100 acres with buildings, including, besides the necessary barns, stables and other farm structures, a store and post-office with telephone connection, a boarding house and three cottages. There is also connected with this establishment a "carry" from Saranac Lake into Raquette River.

Regarding the best manner of managing this adjunct to the property the Council has been somewhat in doubt. The requirements of the management of the forest, as well as that of the College, make it absolutely necessary to keep up such an establishment, while the particular location of the same enjoins a moral obligation towards the public in maintaining it as a public place of entertainment.

The Council wished to avoid the necessity of equipping the boarding house and running the same on account of the College, while to rent it appeared not only difficult but objectionable, as it would hamper the freedom of the administration on its own ground and yet burden it with an implied, if not real, responsibility toward the public for the character of the entertainment.

This matter may become still further complicated when, as is contemplated, the College is transferred for the spring term to Axton, and when the logging operations make free use of the farm, stables, barns, etc., an absolute necessity.

The property came too late into the possession of the Trustees to make any but tentative arrangements, by renting for an entirely nominal sum farm* and boarding house to the farmer who had run the same on a monthly salary for the Santa Clara Lumber Co., he renting the outfit from that company. After the season's experience

*The farm is now (1901) managed separately by the College.

it is expected to continue renting, with such restrictions and conditions, however, that the needs of the administration as well as the reasonable expections of students, transients and other boarders, as to entertainment, will be taken care of.

Work Performed.

The work performed during the nine months of working season, during which the College has been in charge of the property, can be grouped under the different accounts which serve for the apportionment of appropriations, namely:

Topographical Survey.
Road-building, Districting and Opening-up.
Stock taking.
Improvement Account.
Logging Operations.
Building Account.
Administration and Maintenance.

Topographical Survey.

Besides the boundary survey, which in part was performed by the College, a topographical survey of the property has been made and completed but for the sketch work of a few square miles, requiring about four weeks' more work.

For this survey parties were organized under Professors Ogden and Mott of the College of Civil Engineering, and students of that College and the College of Forestry were employed in the work, thus giving, to the latter, especially, a valuable experience.

Since the men received adequate pay, and since the work was carefully supervised by competent surveyors, no charge of cheap and hence unsatisfactory work may be raised against this kind of labor. Indeed this topographical survey has been made on a scale and with a degree of accuracy which has not been usual in the woods in the United States, namely, a scale of 1:4800, or more than twelve inches to the mile, in ten-foot contours, with over 200 measured points to the square mile. On such a map a one-acre lot may still be conveniently located and measured. Such scale and accuracy is by no means recommended for usual woods work, when a scale of 1:20,000 would still do good service; but since this tract is to serve as a model and demonstration forest, it was thought best to incur the heavier expense and attempt a map which would satisfy all possible demands in the future for forest engineering work, road-building, subdivision, locating of nurseries, precise calculation

LANE IN BIRCH AND ASPEN GROWTH OPENED FOR PLANTING SPRUCE AND PINE.

IMPROVEMENT CUTTING IN BIRCH AND ASPEN GROWTH BY STUDENTS.

of planting areas, etc. The value of the map resulting from this survey has already made itself apparent when selecting the location of wood-distilling plants, as well as roads and dams in connection with such plants.

The office map will be completed in portfolio sheets, 25 x 30 inches in size, and a reduced map for field use will be made to a scale of four inches to the mile, on which a ten-acre lot is still recognizable.

Three different methods of survey were employed, furnishing interesting data for comparison of cost, which will be detailed in a special report, the cost varying between $44 and $82 per square mile, the cheapest method being for most purposes serviceable enough. Negotiations are pending for the sale of the survey to the

TIE MAKING.

United States Geological Survey and thereby recovering some portion of the expenditure which that survey would have had to incur in securing the topography of this portion of the State.

Road-building, Districting and Opening-up.

In connection with the survey in township 23, the work of subdivision and opening-up was begun.

For the convenience of an orderly conduct of a forest management and for pur-

poses of protection against fire and otherwise, it is necessary to subdivide the tract and make it readily accessible in all its parts.

Such subdivision or districting may be made by a system of square blocks, or else by adapting the shape of the subdivisions to the lay of the land in more or less irregular figures. The former system is best adapted to level or plains country, the latter to a mountain country. Nevertheless, a square system of subdivision has been applied to the tract in township 23, which is the more level portion of the property, while the natural system will be applied to the more rugged portion in township 26. In this way the two systems and their advantages and disadvantages can be demonstrated.

The property in township 23, which will hereafter be designated as the "Wawbeek District," has been divided by a square system of lines into forty-acre lots or compartments, beginning from the western and southern boundary, so that the lots on the eastern and northern boundary are not always of the full size.

Not all of the division lines have been opened up, but only those running west and east and one line running south and north through the middle, besides the boundary lines. For the present these lines, which were located and used as bases by the surveyors, are opened and brushed for only three or four feet in width, capable of being used as trails, but some of them will be enlarged, as woodcutting progresses from compartment to compartment, separating the tiers of compartments from each other more clearly. The east-west lines are lettered from south to north, and the compartments numbered from west to east, and a post set on every line and quarter mile, so that the compartment can be at once located as soon as a quarter-mile post is found. Thus, if the quarter post marked "H. 6" is found by a guard or laborer or inspector, he knows at once that he is eight quarter miles from the southern and six quarter miles from the western boundary, and he can readily find any other point to which he is sent. The advantage of this very simple and readily comprehensible system of rendering the tract accessible has made itself apparent during the forest fires which, unfortunately, were so frequent during the late summer. In this part of the property it was easy to quickly locate a fire and send squads of men, entirely ignorant of the locality, to the fire. Eventually these lines will also serve as "fire lines," bases from which defensive measures may be employed, together with such roads as will be constructed.

Road-building has been and will be delayed until market conditions are developed and the proper location of a system of roads has been thoroughly studied. There was, however, an opportunity offered to build three-fifths of a mile of highway under contract with the town of Harriettstown, extending the highway built by the town of Santa Clara from Saranac Inn.

This latter road, passing in part through the College Forest, has become a menace to the adjoining property by reason of the brush which the contractor failed to burn and piled alongside the right of way. It was, therefore, desirable, when the opportunity came, as a matter of self-protection, to secure the contract for the continuance of the road, when the needful cleaning and burning of the brush could be attended to and at the same time experience for future work could be gained at least expense. Such road, entailing the clearing of three rods in width and turnpiking one rod, with ditches on each side, passing over stony ground, which requires blasting, can be built, it was found, in a thoroughly satisfactory manner, leaving the edges free from all unsightly and dangerous brush and timber, at the rate of $1,000 per mile.

Stock Taking.

The system of subdivision practised in the Wawbeek District rendered it possible to secure, in a much more accurate manner than is usual, estimates of the timber standing.

In European forest management a knowledge of the timber standing is usually secured by means of actually measuring sample areas and referring the amount found to the larger area, from which the sample areas were selected. In India a modification of this practice exists, which has been imitated in this country in the few instances where stock taking as a basis for arriving at a statement of the admissible or desirable annual or periodic felling budget has been undertaken. This modification consists in meandering through the forest and measuring or estimating the stock in a belt of two rods, more or less, in width along the meander and then judging from the contents of this sample the contents of the whole. It is, in fact, nothing more nor less than the method employed by timber estimators, except that chain measurement is substituted for pacing and calipering diameters of trees and calculation of their contents, instead of relying upon judgment.

Neither of these two methods appeared of practical utility, at least not for the pursuit of the very simple policy proposed in the management, especially since with nearly the same expenditure of time and money a very close estimate, near enough for all practical purposes, of material actually standing on the different portions of the property could be obtained. Hence, three competent estimators were employed to go carefully over the Wawbeek District and estimate all timber standing, making at the same time a description of the character of the ground and growth. For this purpose, each estimator started independently on a given division line into a given compartment, keeping himself oriented by the compass and pacing and the quarter-mile lines and posts; making sixteen stations in the same, as far as possible at even

distances; describing conditions and estimating contents on approximately each two and one-half acres. In this way, it is believed, the guess work was certainly reduced to a minimum, the necessity of furnishing so many detailed statements as well as the estimates and descriptions of the neighboring estimator acting as checks upon any fancies. In this manner a detailed description of every portion and a reasonable estimate, indicating the location of each parcel, was obtained at an expenditure of less than ten cents per acre.

The first use of this information has been made in determining the amount of cordwood that might be contracted for a term of ten years to a wood distillery, and also, with the help of the map, in determining how many retorts might be placed in different parts of the district to secure properly distributed tributary wood supplies. Owing to the necessity of employing the estimators in fighting fires, so much time was lost that the completion of the estimates on the Wawbeek District has been delayed, a few compartments remaining unvisited, and the estimating on the Axton District has been deferred to next season, until the survey and subdistricting could be done. Enough estimating has been done, however, to warrant the statement, open to correction, that the following amount of stock, at most conservative figures, will be found on this portion of the property:

Stock Standing in the Wawbeek District.

12,000,000 feet, B. M.,	Hardwoods.
6,000,000 " "	Softwoods.
32,000 cords,	Pulpwood.
120,000 pieces,	Hemlock ties.
120,000 cords,	Fuel wood.

A much larger area than was anticipated is occupied by swamps, marshes, water and burnt lands, which accounts for the low averages per acre, more than one-quarter of the acreage being waste land. A division of the land in this district as regards its character, open to slight correction, gives the following proportions:

Hardwood ridges,	42.6%
Wooded flats,	30.
Balsam swamps,	8.7
Burnt lands and marsh,	6.7
Clearings,	3.2
Water and sloughs,	8.8

It is estimated, nevertheless, that if the market is properly developed, and means of transportation secured, the stumpage value on the Wawbeek District may yield a considerably larger amount than the price paid per acre, while the Axton District (township 26) will show a very decidedly larger stumpage.

Improvement Account.

Under this account appears all the work and expenditures which are incurred in the direct improvement of the forest conditions, namely, planting operations, cleaning up and similar dead work, which does not bring immediate returns, except when material which is directly salable results from these operations.

It is obvious that, as soon as logging operations are begun, a certain portion of their cost will also have to be debited to this account, namely, as much as these operations are more expensive than ordinary lumbering, by virtue of the greater care with which the logging must be done, to secure and save the young crop.

Planting.

There being by rough estimate at least from three thousand to five thousand acres of cleared land or burnt areas, covered with useless brush and undrained swamps, which are dead and unproductive capital, it is indicated to turn the same, as rapidly as possible, into productive condition by planting these areas with valuable species, *i. e.*, mainly conifers. It is proposed, therefore, to plant yearly, as plant material can be secured, from one to three hundred acres. How to do this cheaply and yet effectively will be the problem to be solved. There are three directions in which this problem needs to be studied, namely:

a. Preparation of the ground for planting.
b. Securing of plant material.
c. Methods of planting.

On the old burns there is a large amount of debris, besides brambles, weeds and brush, which not only renders satisfactory progress in planting difficult, but increases the danger of losing the plantations by fire, and impedes their growth. The removal of these impediments is expensive and must be confined to what is absolutely necessary.

Some of the volunteer growth, if consisting of aspen, not too old, can be left even advantageously, to act as nurses to the young conifers, or will, at least, not interfere sufficiently in their development to necessitate the expense of their removal. Of course, whatever valuable volunteer coniferous growth exists is also saved.

Some fifty acres of sandy slope near Axton, being of this character, and being cleaner of debris than usual, were planted in the spring, without any preparation, two and three-year-old plants being set out with the spade at the rate of about 1,200 plants, 2 to 3 years old, to the acre among the light aspen and shrub growth.

The plants, consisting largely of White Pine and Norway Spruce, with Douglas Spruce and Scotch Pine, were purchased from a nursery, and even selecting this relatively cheap material, the average cost per thousand was $6.50.

The work of planting was performed by a squad of wood-choppers, mostly French Canadians, who had been employed during the winter in chopping down and logging spruce on the neighboring property. The novel occupation of setting out trees, however, very soon became familiar, and they did, as soon as they had learned the modus operandi, as effective work as in the logging. The men worked in pairs, one digging a hole with a spade or hoe, the other following with a pot of loam-puddle in which the plants were carried and setting the plants.

In this manner the average result per two men was one thousand plants per day, the planting costing $3.40 per thousand, or $4.08 per acre, and, in addition to the cost of plant material, $10.58 per acre. This is considered far above what it should and will be, when the planting work is fully organized.

The unusually droughty season was most unfavorable to this first attempt at re-covering the slashes of the Adirondacks, and although the damage cannot yet be stated, it is estimated that probably fifty to sixty per cent. of the plants have succumbed to the drought, and the winter may claim a further contingent.

On a neighboring lot, a thorough clearing of an old burn, containing nothing but old snags, stumps, brambles and brush, has been made for next year's planting, such thorough clearing costing about $20.00 per acre. Alongside the highway from Tupper Lake to Wawbeek Hotel, a clearing has been begun this winter under a third class of conditions, namely, on a burn in log timber on which the trees are still standing and which can be cut into firewood. The wood cut here will, at least partly, pay for the clearing.

Nurseries.

The largest saving in cost of planting it is expected to secure by growing the plant material on the ground, in seed-beds and nurseries, instead of buying it. For this purpose a nursery was at once established at Axton, and some 150 pounds of seed of various kinds sown. The light, sandy soil, which alone was there at our disposal, proved, during the extraordinary drought, a great detriment. It required a large amount of labor to keep the little seedlings supplied with water and shaded with lath screens. Nevertheless, it is estimated that over 1,500,000 seedlings went into winter with a fair prospect of surviving it, and it is expected the plant material from this first sowing, if no unforeseen decimation occurs, will cost from half to one-quarter that paid for bought stock.

THREE YEAR OLD NORWAY SPRUCE IN AXTON NURSERY.

PLANTING ON WASTE LANDS WITH MATTOCK AND DIBBLE.

It will, however, have to be anticipated that, in the absence of all experience in the growing of seedlings in the Adirondack region, with its severe winters and frequent summer frosts — even potatoes were frozen in June and July at Axton two years in succession — results will not always meet hopes or expectations, and disappointments may be in store.

To avoid the last year's experience with the sandy soil and to locate a nursery nearer to the more immediate planting grounds, two acres of ground have been cleared on the Wawbeek District in a favorable situation on the road to Tupper Lake.

THE WINTER'S HARVEST.

Experience will also teach what species besides the White Pine should be used. The White Pine is at home in the Adirondacks and is the most valuable timber, so far known, that may be grown there. The native Spruce appears to be a rather slower grower than other technically equally valuable species, although these may, if introduced into the severe climatic conditions, prove perhaps disappointing in the rate of growth. The Norway Spruce, apparently a much more rapid grower than the native Spruce and a hardy species, has the advantage that plant material can be obtained much more cheaply than of any native species. It will, therefore, be largely used, even if only as filler, when no harm will be done should it appear less promising in its production. The European Larch and, to a less degree, the Scotch Pine

will also be given a trial. Of American species not native to the Adirondacks, the Douglas Spruce from Colorado will be favored, as a promising importation, and other species will at least be put on trial. Of hardwoods, it is questionable whether additions may be made of special value, although the hardiness of some will be tested.

Sowing the seed instead of planting may also be tried, although the probability is that, with the seasons so uncertain, the protection that can be given in the nursery, where the young seedlings are helped over the first tender years, will insure better success from the use of plants. It was intended to secure the seed material of White Pine and Spruce by collecting it in the Adirondacks — the hardiness of plants depending, in part, upon the locality from which the seed is secured — but the present year was a total failure in seed production, especially for White Pine, not only in the Adirondacks, but in other parts of the country as well.

Logging Account.

The work in the woods having, so far, been confined to clearing for roads and planting, only a crew of fifteen to twenty men has been maintained, located in the Wawbeek Camp. Besides a small amount of logs resulting from this operation, some 1,000 cords of stovewood have been prepared, for which a market will be found in the neighborhood, among the hotels and private camps. It has been the aim to bring together a crew of exceptionally good, reliable woodmen, who may become the staple nucleus of the logging crews which will have to work with greater intelligence and care than is usual, in order to secure the results which a forest management is after.

It is true, perhaps, that contract work would be cheaper, but it would be correspondingly unsatisfactory, the restrictions which would have to be imposed would be difficult to enforce, and finally lead to a raising of contract prices to the amount which work under such restrictions would necessitate.

At present writing the first tentative logging operation is being undertaken with a view of gaining experiences, under the following instructions to the manager:

Instructions for Sample Cutting.

Object: 1. To furnish a sample of how to cut out the old timber with a view to giving chance for young volunteer growth to develop, and especially of young spruce.

2. To determine the cost of lumbering with such care as the above considerations imply.

3. To secure experience-figures of results as to different grades of material secured in such lumbering.

Procedure : 1. Select a forty-acre lot located near western boundary, in satisfactory hauling distance from Tupper Lake, which contains a large amount of young spruce from three-inch diameter down.

2. Mark all trees to be cut, and measure their diameters, breast high, before cutting, by two-inch diameter classes, noting them by species.

3. In selecting and marking trees to be felled, the following rules are to guide:

a. No spruces are to be taken excepting dead or crippled ones.

b. All young thrifty growth of birch and maple below ten-inch diameter, breast high, is to be left, unless evidently interfering with young spruce, or unless old runts and with low spreading crowns. All crippled and dead trees to be cut.

c. If any choice in the removal of different kinds becomes necessary, the advantage is to be given to the better kinds, following the grades from pine to spruce, balsam, hemlock, birch and maple.

d. All beech that can be cut into firewood is to be taken.

e. All hemlock, unless thrifty young growth, from six inches down, is to be taken.

f. Whenever there is any absence of young volunteer growth, leave enough older timber to avoid making larger openings than four rods square.

g. Log with utmost care for young growth, felling trees into openings and avoiding the smashing of polewood.

h. In cutting roads, avoid as much as possible passing through young spruce.

i. Prepare, split, and set up firewood on roadsides — all cordwood to be cut fifty-two inches in length, sawn — all crooked pieces and rough wood sawn or chopped.

j. All material down to three-inch diameter to be worked up; all fuel wood over five inches to be split; cordwood to be set up by grades; all sound material over ten inches to be cut into logs, or eight inches if sound core, to be skidded separately by sizes; all logs over fifteen inches to be kept separate. All hemlock logs to be held out.

Building Account.

As stated in an earlier part of this report, the main establishment, where the administration of the College Forest is located, consists of a collection of buildings at Axton. All buildings which were in condition to warrant their retention were put in good repair and painted, and some dilapidated barns and sheds, which should be removed as unsightly and dangerous, are still in existence, since the storage room

they offer cannot be dispensed with until substitutes are built. The desire to restrict expenditures as much as possible to absolute necessities and to essentials rather than conveniences has delayed the building of these substitutes.

The necessity of keeping up this establishment has been pointed out before, and a certain amount of the revenue will have to be devoted to its improvement and maintenance.

A two-story and attic students' dormitory, 36 x 60 feet, is to be built this spring, the stone for foundations having been blasted and hauled, and the lumber purchased.

In addition, there are on the Axton District, besides the squatters' establishment previously mentioned, which will presently come into possession of the College, a number of old logging camps. One of these has been put in good repair, and has served the surveying parties during the summer and will presently become the habitation of one of the needed guards, being located about three miles from Axton, towards the eastern boundary, which, owing to the unusually large amount of debris, resulting from the logging operations of the Santa Clara Lumber Co., is in special danger of fire. Another such camp, at the southern boundary, will also be put in repair for similar purposes.

In the Wawbeek District it has become necessary to build anew, in order to accommodate the crew of men who are now at work clearing and cutting cordwood. This camp, consisting of men's house, 36 x 40 feet accommodating 40 men, and a barn, 50 x 30 with smithy substantially built of lumber, with a view to permanency, will serve as the center of operations for the district, being located near the nursery, on the Wawbeek Highway, centrally to the district, although this will not exclude the necessity of locating temporary camps in different parts of the district, as the needs of logging operations require.

Administration and Maintenance.

The first step in the administration of a property is to become acquainted with its every detail, hence the forest survey above described was begun as soon as the surveying parties could be organized and equipped, which was not until the end of May, when the boundary survey was begun, to be followed by the topographical survey (parties being organized at the end of June) and the timber estimators, the number of men employed at various times varying from 10 to 35.

For these parties not only camp outfits had to be secured, but provisions furnished, as only occasionally could quarters be found in the proximity of the work. The surveying parties varied in numbers, the main parties breaking up in September,

PLANTING BURNT LAND.

when only one party remained in the field until the snow in December made farther progress impracticable.

Besides the supervision of the survey and the other lines of work detailed before, the most important feature of the three-quarter year's administration was the fighting of forest fires.

Equipment.

The equipment has been kept within the immediate necessities, and consists so far, besides surveying instruments, largely of camp outfit which was needed for the survey and will always be needed in logging and planting operations. Two pairs of horses were purchased after it became apparent that even without logging operations the required horse hire was much more expensive than the keeping of teams. A smithy and the necessary logging and planting tools, wagons, sleds, etc., were added, but as soon as logging operations begin this equipment will have to be considerably enlarged.

Forest Fires.

These fires, very unusually, occurred in the month of August, as a result of the long continued drought, which also reduced the rivers and brooks to the lowest stage known, and finally even wilted the leaves of the trees in the forest, notably of birches, young as well as old.

Fires broke out in various places, and while, no doubt, carelessness of hunters, surveyors and campers, with smudges, matches, etc., was usually the immediate cause, at least four of these fires could, with reasonable assurance, be traced to lightning. Patrols were kept up during the dangerous season, the estimators and surveyors also being especially instructed to keep watch as they came from and returned to work.

Most of the fires were soon discovered and put out before appreciable damage was caused, although entailing considerable expense on account of the difficulty of surely extinguishing fire in the duff which covers the soil. Here the fire would, to all appearances, be dead and yet break out again after a day or so. Much experience was gained as to the character of fire under different conditions, and the means of combating it.

On the ridges covered with old hardwoods, the danger is, as a rule, small, the fire burning slowly in the duff; if discovered in time — and this is not always as easy as it would appear, even if the smoke is visible — one or two men with spades can trench around the spot and confine the fire to the trenched area, when the spot need

only be watched that the fire may not eat its way across the trench, or that an old snag on fire may not be thrown across and propagate the fire beyond the trench.

These old snags, dead trees with broken tops, are, it is believed, a prolific source of danger, not only in attracting lightning, but in keeping and propagating fires. The damage done by soil fires under these conditions consists in the consumption of the leaf mold and soil, and the trees usually are killed, their roots burnt through and they topple over, either at once or in the next windstorm. Four fires occurred under such conditions and, with the exception of one case in which one and one-half acres were burnt over before the fire was found and put out, not more than a few square rods were damaged.

In the balsam swamps, when dry as they were last summer, the fire also smolders merely in the ground; it is still more difficult to locate, as the smoke quickly fills the woods and hangs in the low crowned balsams.

The dangerous fires are those which start in openings, old clearings, marshes, slashes and young brush woods, for here the winds have access and fan the fire into fierce flames which become absolutely resistless to human endeavors. Two such fires were experienced, one originating in an old clearing, all grown up with brush, supposedly from a spark thrown from a snag that was set on fire by lightning, the other originating in a marsh, probably through carelessness. The former was confined to within about 20 acres, but required 110 labor days and the hauling of water with a team for three days, before it was entirely subdued, the fire continuing for ten days. The second fire was discovered by the surveying party in an old pine barren, adjoining a marsh covered with Labrador tea and sphagnum moss, usually under water, but this year entirely dry. The fire was put out, watched several days and reported out by two experienced woodmen on the forenoon of August 18th, but within less than three hours it was seen blazing again, and assumed rapidly such proportions that the four surveyors who discovered and tried to put it out had to retreat. By evening, when the writer reached the place, the fire had entered the swamp, and nearly two miles of fire line were eating their way through the low shrubs and moss.

An organized effort of the surveying force through the night, in whipping the fire out, was successful, except on a hardwood ridge on which a large number of fallen logs and stumps were blazing. This hill it was necessary to surround by a trench, which was at once commenced, additional help having arrived in the morning. Before, however, this trench had progressed far enough, the wind had again fanned the flames, and all efforts to keep the fire confined were in vain; by evening it had again entered the marsh progressing rapidly. Again the night was used with advan-

tage — the dew and absence of wind being favorable to whip out the fire. During the night more than one hundred men had been assembled, and it was hoped to end the battle, although by this time more than 4 to 5 miles of front had to be defended.

The continued heat and the variable strong winds, however, proved too inimical; the fire could not be held in check along the entire line, and broke over the lines of defense in various places, eating its way across the marsh into the surrounding timber. The fourth day was consumed in quenching single nuclei of fire to retard it and in throwing up ditches a considerable distance away from the fire front, with the expectation of stopping it in the hardwood ridges, where the winds are powerless. In the afternoon the fire ran with such fury through the young timber surrounding the marsh that the men, in places, had to run for their lives. That night, fortunately, a heavy thunderstorm with abundant rain quenched the fire, although even such a downpour could not quite extinguish it at all points, and it took over a week to accomplish entire extinction. Altogether over 290 labor days were required in fighting this fire.

About nine hundred acres were burnt over, being mainly a useless marsh and an old burn grown up during the last thirty years with aspen and white pine, a promising young crop, only a small amount of old timber being damaged.

The Forest Preserve Board, by most judicious action, advanced the money to pay for the fire fighting, which would otherwise have had to be recovered with much delay from the towns, the total expense for all fires having been $1,035.00.

This experience brought the valuable lesson that a strip of old timber is probably a better protection against dangerous fires than an open fire lane in which the winds have access; that old snags and logs, especially of pine, are a great danger; that large openings in which the wind can develop force are to be avoided; that no plantations should be made on these open clearings and burns without dividing them at once by trenches, kept in condition, so as to limit eventual fires.

By the law the protection of the College Forest, as far as fires and game preservation is concerned, lies with the Fisheries, Game and Forest Commission, who appointed the superintendent of the College Forest as deputy fire warden, thereby meeting the first requirement.

Protection, however, is needed against the most prolific cause of forest fires — the careless hunters. It will become necessary, simply for the sake of securing partial protection against this cause, to restrict or prevent altogether the hunting, at least in those parts which are most exposed and where plantations are made, since without such protection the expenditure of money on these improvements would be entirely thrown away.

Expenditures and Income.

The following statement shows the expenditures in the various directions and the balance of the appropriation left:

Appropriation,		$30,000 00
Survey,	$3,668 73	
Road-building and opening-up,	1,650 00	
Improvement account,	2,455 88	
Building account,	2,661 47	
Equipment,	2,058 53	
Office and maintenance,	5,692 37	
Balance,	11,813 02	

The income so far has been mainly in the shape of reimbursements for work done or board furnished in the camps, excepting the small rents collected. These items are as follows:

Rents,	$79 50
Highway construction,	464 20
Board of State Survey, etc.,	265 00
Board of fire crew,	347 25
Total,	$1,155 95

Epitomizing the contents of this report, the following points may be briefly noted:

1. The College shows a gratifying increase in students (17), and in usefulness to the other branches of the University. Its main difficulty at present is the absence of suitable accommodations.

2. The transfer of the junior and senior classes to the College Forest during the spring term for the purpose of practical work, and the institution of a course on practical fish culture during that term, are the main changes in the plan of instruction.

3. The College Forest has been surveyed and partially subdivided and made accessible, and the contents of material ascertained in part.

It was found that the proportion of waste land in Township 23 is much greater than anticipated, but that nevertheless the purchase price is considerably more than offset by the stumpage value of material as soon as the market may be developed.

4. The general policy for the administration is outlined to require, besides the primary object of educational demonstration, as the silvicultural object, the replacement of the old, over-mature hardwoods by a young crop of conifers with a reduced

STOVE WOOD CUT FROM THE BURNT TREES ALONG TUPPER LAKE ROAD.

proportion of hardwoods within the thirty-year term or sooner, and planting up waste lands to productive crops simultaneously.

5. The development of a hardwood market by location of a manufacturer using especially the inferior fuel wood is pointed out as the first requirement for securing the silvicultural object. The conditions under which such manufacturing enterprises can be secured are argued, and the existence of contract propositions, contingent upon legislative action, announced.

6. The work performed is shown to have consisted besides the preparatory work of survey and stock-taking, mainly in planting fifty acres of slash, clearing for next year's planting a like amount, establishing a nursery for plant material containing some 1,500,000 seedlings, building portions of a highway, and opening and making accessible Wawbeek District in which operations over 1,000 cords of stove wood and a small amount of logs have resulted; repairing and painting buildings and building a new camp.

Summarizing the needs of the College and College Forest Administration, they can be briefly stated as follows:

1. A building to house the College at Cornell University, the cost not to exceed $50,000.

2. An appropriation of $10,000 to carry on the work of the College.

3. An appropriation of $50,000 as a working capital for work in the College Forest, with the proviso that all incomes may be covered into a special fund to be used for the management without further appropriation.

THE HUNTER'S PRIDE.

The Course in Forestry Leading to the Degree of Bachelor of the Science of Forestry.

The courses of the spring term in the junior and senior years will be given in the College Forest at Axton, N. Y. Students must therefore arrange their courses in other branches so as to keep the spring term entirely free for work in the woods.

[*Courses in parentheses are elective in whole or in part.**]

FRESHMAN YEAR.

	NO. COURSE.	FIRST TERM.	SECOND TERM.	THIRD TERM.
Solid Geom., Adv. Algebra, Pl. and Sph. Trig. (Math.),	7	2	2	2
Anal. Geom., Calculus, (Mathematics),	10	(3)	(3)	(3)
Physics,	2b	5	5	5
Chemistry,	1	3	3	3
Invertebrate Zoology,	1, 3	3	—	3
Vertebrate Zoology,	2	—	3	—
Botany,	1, 2	3	3	3
Meteorology (Geology),	23	2	—	—
Forestry,	1	—	—	2

SOPHOMORE YEAR.

Chemistry,	16	4	4	(4)
Entomology,	7	—	2	—
Entomology,	4, 5	(3)	—	(3)
Systematic Dendrology (Botany),	9	3	—	—
Biological Dendrology,	—	—	3	3
General Geology,	21	3	3	3
Soils (Geology),	32	—	2	—
Pen Topog. (Engineering),	4	—	2	—
Land Surv. (Engineering),	5	—	—	4
Political Economy,	51	—	3	3
Forestry,	2	(3)	(3)	—

* All electives must be chosen at the beginning of the year with the previous written approval of the Director.

JUNIOR YEAR.

	NO. COURSE.	FIRST TERM.	SECOND TERM.	THIRD TERM.
Botany,	11	3	3	—
Physical Geography (Geology),	22	(3)	(3)	(3)
Systematic Zoology, Fish Culture and Game-keeping,	19	2	2	2
Forestry,	3	4	4	—
"	13	—	—	5
"	4	—	—	3
"	6	—	3	—
"	15	—	—	5
"	7	—	3	—
"	14	—	—	3

SENIOR YEAR.

Political Economy,	59	(2)	(2)	—
Law,	2	2	2	—
Forestry,	5	4	—	—
"	8	4	—	—
"	16	—	—	10
"	17	—	—	2
"	9	—	2	—
"	10	—	3	—
"	11	—	2	—
Seminary,	—	3	3	—

The courses in fundamental and supplementary branches are selected from those offered in the Departments of the University. Some of these courses are fuller than necessary for students in forestry and may possibly be shortened, leaving more room for electives. The courses advised are: Mathematics, 7; Physics, 2a; Chemistry, 1, 16, 21b; Zoology: Invertebrate, 1, Vertebrate, 2, Entomology, 3, 7; Botany, 1, 2, 5, 9, 11; Geology, 10, 21, 22, 23, 32; Engineering, 4, 5; Political Economy, 34, 51, 59.

Courses in Forestry.

(Days and hours to be arranged.)

1. **Synoptical Course in Forestry.** Economic Nature and Political Aspects. Designed especially for students of Political Economy, Agriculture, Engineering, and freshmen in the College of Forestry, to acquaint the student in a brief manner with the several subjects comprising the field of forestry. Lectures only. Two hours. Spring term. Professor FERNOW.

2. **One-Year Course in Forestry, with Special Reference to Silviculture.** Designed especially for Agriculturists and others who desire a brief study of the technicalities of woodcraft and silviculture. Lectures and demonstrations. Three hours. Fall and winter. Assistant Professor GIFFORD.

3. **Silviculture.** Principles of Arboriculture, application of dendrology to crop production, methods of reproduction, improvement of the crop, nursery practice and forest planting. Lectures, recitations and field demonstrations. Four hours. Fall and winter. Professor FERNOW.

4. **Forest Protection.** Methods of guarding against trespass, loss from fires, insects and diseases; measures to prevent erosion, washing and deterioration of soils. Lectures and recitations. Three hours. Spring term. To be given in the College Forest. Assistant Professor GIFFORD.

5. **Timber Physics and Wood Technology.** Technical properties of wood and its uses. The course is arranged to meet also the needs of students in Civil Engineering, Architecture, and others interested in the properties and uses of wood. Lectures, recitations and laboratory work. Four hours. Fall. Assistant Professor ROTH.

6. **Exploitation.** Methods and means employed in the harvest of forest products, logging, transportation, milling, and preparation of wood for market. Lectures and recitations. Three hours. Winter term. Excursions to actual operations and points of manufacture. Assistant Professor ROTH.

7. **Forest Mensuration.** Methods of ascertaining volume of felled and standing trees, of whole forest growths, timber estimating, determining accretion of trees and stands. Lectures, recitations and field work. Three hours. Winter. Assistant Professor ROTH.

8. **Forest Regulation.** Principles and methods underlying the preparation of plans of management for continuous wood and revenue production. Lectures and recitations. Four hours. Fall term. Field work in spring. Professor FERNOW.

9. **Forest Valuation.** Principles and methods of ascertaining the money value of forest growths at different ages for purposes of sales, exchanges, damage suits, etc. Lectures. Two hours. Winter term. Professor FERNOW.

10. **Forestry Statics and Finance.** Application of the principles of finance to forest management; methods of finding the most profitable form of management, determining rotation and expenditures with reference to revenue. Lectures and recitations. Three hours. Winter term. Professor FERNOW.

Courses 8, 9, and 10, will, for the present, be merged into one course through fall and winter.

11. **Forestry History and Politics.** Historical development of the economic and technical features of modern forestry; forestry conditions at home and abroad; forests and forestry as factors in the household of the community and Nation; basis and principles underlying forest policies of the State. The course will prove of value and interest to students of political economy. Lectures only. Two hours. Winter. Assistant Professor GIFFORD.

12. **Seminary in Reading of German Forestry Literature.** Three hours. Fall and winter. Professor FERNOW.

Work in the College Forest.

The spring term for the junior and senior year students will be held at Axton in the College Forest, and will largely consist of practical work in the following courses, in addition to Course 4 on Forest Protection:

13. **Practicum in Silviculture.** Nursery practice, planting in forest improvement cuttings, marking for second cutting, etc. Five hours. Assistant Professor ROTH.

14. **Practicum in Forest Mensuration.** Three hours. Assistant Professor ROTH.

15. **Practicum in Exploitation and Surveying.** Visits to logging operations, illustrating fellings, skiddings, landings, driving, transportation, and milling. Laying out and constructing roads. Methods of subdividing and marking forest areas. Five hours. Assistant Professor ROTH.

16. **Practicum in Forest Regulation.** Thesis work. Making of a working plan for a given area.

17. **Forest Administration.** Organizing a forestry service, manner of employing and supervising labor, business methods as applied to forest management. Lectures and recitations. Two hours. Spring term. Assistant Professor GIFFORD.

18. **Pisciculture.** Practical demonstrations and lectures. Professor B. W. EVERMAN.

19. **Game Preservation.** Lectures and demonstrations. Assistant Professor GIFFORD.

The practical courses, Nos. 13 to 16, while credited as to time in the same manner as the regular University courses, will necessarily be distributed throughout the term as weather permits and occasion requires. It is proposed to concentrate as much as possible each kind of practical occupation into a given period, and to devote never less than a full day to any one kind of work, leaving lectures and indoor work for rainy days and evening hours.

In general, at least four weeks will be devoted to silviculture, three weeks to forest mensuration, and three weeks to survey, subdividing, laying out of roads, building of bridges, culverts, etc. The senior students will for most of the time be occupied with their theses, which will consist in the complete survey, subdivision, description, stock-taking and making of a working plan for a tract set aside for the purpose.

For the junior students, as far as weather conditions may permit, the ten weeks of the term will be tentatively divided as follows:

First week: Visits to logging camps, river drives, maple orchards, sawmills and other kinds of operations exhibiting forest exploitation, and measurement of logs and cordwood.

Second week: Improvement cuttings. Each student will be expected to perform, under competent guidance, the operations required in such cuttings, especially the freeing of conifers and the marking of such trees as should be removed, if material were salable.

Third and Fourth weeks: Marking out trees to be cut for reproduction; estimating and measuring stock.

Fifth and Sixth weeks: Planting to forest and nursery work. Each student is expected to perform all the manipulations in planting and sowing, in field and nursery, for a sufficient number of days to become thoroughly familiar with the use of tools and the handling of plant material. This work will naturally have to be shifted to such time as the season may dictate.

During these weeks the course on pisciculture will also occupy lecture hours and field-work.

Seventh and Eighth weeks: Surveying and road-building. Line surveying, topographic work, and laying out of roads of various classes and grades, assisting in actual road-building and building of culverts, etc.

Ninth and Tenth weeks: Improvement cutting in the leaf, and Forest Description. Each student will make a full description of a given area of the College Forest assigned to him as a basis for a working plan.

The field-work will be in charge of Assistant Professor ROTH, with occasional inspection by the Director.

The lectures, with field excursions, on forest protection, forest administration and game preservation, will be given by Dr. GIFFORD.

Course on Fish Culture.

This novel course — the first as far as we know of the kind in any institution of the United States — has for its object to give some acquaintance with the purposes, methods and results of fish culture in this country, and has been placed under the direction of one of the most competent experts, namely, the well-known ichthyologist of the United States Commission of Fish and Fisheries, Prof. Barton W. Everman, Ph. D. Prof. Everman combines with his wide range of theoretical and scientific knowledge not only experience in its practical application, but the rare gift of imparting his knowledge in an interesting manner, having graduated from the University of Indiana in 1886, and for ten years practiced as teacher and superintendent of schools in Indiana, and for five years as professor of biology in the Indiana Normal School. Entering the U. S. Commission of Fish and Fisheries in 1888 as assistant and being promoted to the position of ichthyologist in 1892, in which year he also acted as U. S. Fur Seal Commissioner, he has been in charge of investigations into the food habits and distribution of fish, the location of hatcheries, and other scientific and practical work in these lines. His literary work is largely contained in the reports of the U. S. Commission of Fish and Fisheries, the principal subjects being: Studies of the Salmon of the Pacific Coast of America; The Fishes of the Rio Grande Basin; The Fishes of the Missouri Basin; The Fishes of Florida; several reports to Congress regarding investigations for the selection of fish hatchery sites in Montana, Wyoming, Tennessee, South Dakota, Nebraska and Iowa. He is also author in cooperation with Dr. David Starr Jordan of the work in four volumes entitled "The Fishes of North and Middle America."

The course will consist in a series of daily lectures for two weeks with laboratory work, field excursions to the ponds, lakes and rivers, and visits to the State Hatchery at Clear Water, within a few hours of Axton. One or more lectures will be devoted to the following subjects:

1. Natural reproduction among fishes; manner of fertilization; conditions under which spawning takes place; dangers which beset the eggs, the fry and the young; necessity for artificial propagation; natural and artificial methods contrasted.

2. The species of fishes propagated artificially in America; the spawning time, place and habits of each, especially those native to the State of New York.

3. The Salmonidæ, or salmon trout and whitefish; methods of artificial propagation in detail.

4. The Black Bass and other centrarchidæ; methods of culture.

5. The Shad, Wall-eyed Pike, etc.

6. The care of fish fry.

7. Methods of shipment of eggs, fry, fingerlings and adults; how plants of fish are made.

8. Pollution of streams and lakes and fish protection.

9. Fish culture in America, its history and results.

Various other phases of fish culture not especially mentioned in the headings given above will not be omitted in the lectures, nor will object lessons in the field be wanting.

THE END OF THE JOURNEY.

Appendix.

Details of Financial Statement.

Schedule "A."

Summary of Expenditures on Account of Hatcheries and Hatching Stations, Collection and Distribution of Fish, Fish Fry and Eggs for Fiscal Year Ending September 30, 1899.

Adirondack Hatchery,	Saranac Lake, Franklin Co.,	$6,701 77
Beaverkill "	Rockland, Sullivan Co.,	1,567 22
Caledonia "	Caledonia, Livingston Co.,	12,438 52
Cold Spring "	Cold Spring Harbor, Suffolk Co.,	8,340 02
Fulton Chain "	Old Forge, Herkimer Co.,	4,009 04
Pleasant Valley "	Taggart, Steuben Co.,	5,196 50
Sacandaga "	Speculator, Hamilton Co.,	2,396 15
Oneida "	Constantia, Oswego Co.,	2,094 95
Chautauqua "	Chautauqua Lake,	983 05
Catskill "	Catskill, Greene Co.,	703 00
Clayton "	Clayton, Jefferson Co.,	524 40
Canandaigua and Hemlock Lake,		1,543 09
Lake Superior lake trout eggs,		825 81
James Annin, Jr., Superintendent, salary,		2,500 00
" " traveling expenses,		363 39
Superintendent's office, Caledonia, office expenses,		1,034 40
Caledonia Ponds improvement,		2,281 16
Fish car Adirondack, repairs,		550 64
J. W. Mead, Warden, prison goods, brooms, etc.,		67 09
Milton Clark Co., insurance on hatcheries,		240 00
J. W. Fiske, fish tanks,		577 95
Blue line transfer, freight on fish tanks,		43 47
W. H. Butler, repairs to fish tanks,		13 50
J. P. Allds, map, etc., Oneida hatchery,		23 50
Brandow & Co., printing and stationery,		35 58
J. H. Lamphere, disbursements removing fish from canal at Montezuma,		66 50
H. L. Carpenter, photographic work for report,		60 81
H. N. Silsby, services removing fish from Cayuga Lake,		48 00
H. A. Ball, " " "		24 00
George Sullivan " " "		16 00
George A. Brown, " " "		16 00
Bud Johnston, " " "		74 33
George E. Squire, " " "		10 00
		$55,369 84

Schedule "B."

Summary of Salary and Expenses Paid Fish and Game Protectors and Foresters for Fiscal Year Ending September 30, 1899.

	Salaries.	Expenses.	Total.
J. W. Pond, Chief Protector,	$2,000 00	$949 47	
Jno. E. Leavitt, Asst. Chief,	1,200 00	750 00	
M. C. Worts, "	1,200 00	740 50	
M. C. Finley, Special Agent,	1,000 00	214 43	
Wm. Wolf, Clerk to Chief Protector,	1,287 50	8 52	
John L. Ackley, Protector,	222 27	198 90	
Wm. J. Alfred, "	375 02	311 39	
F. S. Beede, "	500 00	450 00	
E. I. Brooks, "	223 07	223 25	
Thomas Carter, "	500 00	439 80	
George Carver, "	500 00	440 00	
F. E. Courtney, "	21 48	18 75	
T. H. Donnelly, "	500 00	441 00	
Geo. W. Earl, "	270 79	243 75	
L. S. Emmons, "	500 00	440 00	
Spencer Hawn, "	500 00	438 10	
Geo. W. Harmony, "	500 00	397 33	
E. A. Hazen, "	500 00	440 30	
James Holmes, "	500 00	427 45	
Carlos Hutchins, "	500 00	450 00	
R. S. Jones, "	500 00	440 00	
Willett Kidd, "	500 00	440 00	
Jas. H. Lamphere, "	500 00	440 00	
E. J. Lobdell, "	479 17	110 55	
B. H. McCollum, "	500 00	450 00	
J. B. McCook,	229 13	196 22	
D. H. McKinnon, Protector,	500 00	440 10	
Jos. Northup,	500 00	438 09	
Samuel Pearsall,	500 00	418 84	
F. M. Potter, Protector,	500 00	384 53	
W. L. Reed,	500 00	440 00	
Barnard Salisbury,	500 00	372 02	
N. A. Scott,	500 00	386 05	
Jas. F. Shedden,	500 00	448 67	
Geo. B. Smith,	500 00	440 10	
Forward,	$20,008 43	$13,868 11	

	Salaries.	Expenses.	Total.
Brought forward,	$20,008 43	$13,868 11	
Isaiah Vosburgh,	229 13	179 16	
H. L. Wait,	500 00	412 50	
Albert Warren,	500 00	440 00	
A. D. Wellman,	208 30	177 50	
Alvin Winslow,	500 00	449 17	
A. A. Wyckhoff,	270 87	253 51	
	$22,216 73	$15,779 95	$37,996 68

Schedule "C."

Official Salaries and Expenses.

	Salary.	Expenses.	
B. H. Davis, President, 13 mo.,	$3,250 00	$866 66	
Wm. R. Weed, Commissioner, 13 mo.,	2,708 34	866 66	
Chas. H. Babcock, Commissioner, 13 mo.,	2,708 34	866 66	
Edward Thompson, Commissioner, 13 mo.,	2,708 34	866 66	
H. S. Holden, Commissioner, 13 mo.,	2,708 34	866 66	
A. N. Cheney, Fish Culturist, 13 mo.,	3,250 00	978 51	
Wm. F. Fox, Supt. of Forests, 6 mo.,	1,500 00		
	$18,833 36	$5,311 81	
Total,			$24,145 17

Schedule "D."

Clerical Force.

Chas. A. Taylor, Asst. Secy., 13 mos,	$1,950 00	
" " Expenses allowed,	216 74	
" " Extra services,	500 00	
A. J. Mulligan, Auditor,	1,605 00	
A. B. Strough, Special Agent,	1,566 70	
J. J. Fourqurean, stenographer,	1,300 00	
J. W. Pond, Chief Protector,	166 74	
Wm. Wolf, clerk,	62 50	
J. D. Taylor, typewriting,	10 50	
		$7,378 18

Schedule "E."

Office Expenses.

Postage and box rent,		$597 57	
			$597 57
Telegrams and telephone:			
Western Union Telegraph Co.,		$329 37	
Postal Telegraph Co.,		30 67	
Hudson River Telephone,		204 84	
			564 88
Transportation of packages:			
American Express Co.,		$483 06	
National Express Co.,		220 73	
United States Express Co.,		6 16	
E. A. Morgan, expressage,		115 57	
Chas. A. Taylor, freight,		33 30	
			858 82
Printing and stationery:			
Brandow Printing Co.,		$829 26	
Hudson Valley Paper Co.,		116 41	
S. G. Speir,		18 25	
L. S. Van Arnum,		2 25	
Albany News Co.,		3 96	
A. H. Clapp,		1 00	
Tablet & Ticket Co.,		2 85	
Smith Premier Co.,		9 00	
			972 98
Miscellaneous expenses:			
Chas. A. Taylor,	wrapping and shipping reports,	$38 33	
" "	cartage and freight,	33 36	
" "	recording papers and search,	7 50	
Great Bear Spring,	water,	4 20	
J. J. Fourqurean,	notary fee,	5 00	
H. D. Keefer,	books and papers,	18 90	
Lang Stamp Works,	rubber stamps,	10 20	
" "	net tags,	40 40	
A. M. Michael,	"	20 00	
James B. Lyon,	1,000 game laws,	75 00	
Wynkoop Hallenbeck Co.,	3,000 game laws,	225 00	
Dey Bros.,	1 American flag,	17 50	
Wooster Furniture Co.,	1 chair,	13 00	
F. N. Sisson,	lamp and fixtures,	9 30	
	Amount forward,	$517 69	$2,994 25

	Brought forward,	$517 69	$2,994 25
The Argus,	subscription,	7 50	
A. D. Kirch,	wood samples,	10 76	
Joseph McDonough,	books,	25 35	
K. E. McClellan,	photo work,	4 00	
N. L. Stone,	photo work,	75 00	
Henry Romeicke,	press clippings,	4 00	
C. M. Ward,	file cases,	10 50	
J. G. Myers,	window shades,	8 40	
Forest and Stream,	subscription,	4 00	
A. B. Strough,	sundry office expenses,	4 70	
A. J. Mulligan,	sundry office expenses,	32 87	
C. F. King,	typewriting	34 48	
Sampson, Murdock & Co.,	directory,	3 00	
			742 25
Total office expenses,			$3,736 50

Schedule "F."

Shellfish Office Expenditures.

Selah T. Clock, Oyster Protector,	salary,	$1,200 00	
Selah T. Clock, Oyster Protector,	expenses,	375 10	
Edgar Hicks, Oyster Protector,	salary,	1,083 37	
Edgar Hicks, Oyster Protector,	expenses,	750 00	
John Ferguson, Assistant Oyster Protector,	salary,	617 50	
John Ferguson, Assistant Oyster Protector,	expenses,	392 39	
C. B. Kansier, cashier,	salary,	1,300 00	
W. E. Sylvester, confidential clerk,	salary,	580 00	
Charles A. Taylor,	postage,	77 00	
Brandow Printing Co.,	printing and stationery,	72 92	
Griffith & Sons,	insurance on steam launch,	15 00	
Metropolitan Life Insurance Co.,	office rent,	1,913 62	
	Amount forward,	$8,376 90	

	Brought forward,	$8,376 90	
Western Union Telegraph Co.,	telegrams,	39 62	
New York Telephone Co.,	telephone,	118 25	
H. C. Leman,	stationery,	23 84	
	expressage on packages,	58 15	
American District Tel. Co.,	services,	8 90	
J. Mahoney,	washing towels,	6 00	
Estey Wire Works,	wire screens,	14 58	
E. Pinot,	fish tanks,	150 00	
Madison Square Garden,	freight and cartage on tanks,	63 32	
J. H. Ellsworth,	posting notices,	25	
Jno. W Heatherington,	"	1 00	
Edward Thompson,	office furniture,	7 75	
"	electric fan,	3 50	
Launch expenses:			
Standard Oil Co.,	naphtha,	44 08	
	paints and oils,	8 55	
	rope, twine and waste,	1 13	
J. Neil, Jr.,	hauling out launch, storage, etc.,	20 00	
Charles McKay,	assistance,	10 00	
Willett Kidd,	naphtha and pilot services,	63 79	
H. Seawood,	assistance,	8 50	
C. Clements,	janitor services,	6 00	
	2 sponges, .90; sapolio, .16; 1 bucket, .25	1 41	
	Paint brushes, .40; 1 broom, .35; 1 dustpan, .15	90	
Electric Power Co.,	repairs,	8 95	
H. Parker,	assistance,	2 00	
J. Harrington,	assistance,	1 00	
	1 scrub brush, .20; 1 whisk broom, .25,	45	
			671 92
	Total Shellfish Office,		$9,048 82

Schedule "G."

STATE RESERVATION ON THE ST. LAWRENCE RIVER.

1898.				
Oct. 7.	To Chas. A. Taylor,	expenses inspecting lands and docks,	$169 73	
	Frank Dewolf,	purchase price land on Wells Island,	500 00	
		Amount forward,	$669 73	

1898.		Brought forward,	$669	73
Nov. 10.	A. E. Keech,	signs for Reservation,	15	00
	Jos. Northup,	clearing up grounds,	355	10
	Chas. A. Taylor,	expenses inspecting lands,	137	40
Dec. 14.	W. E. Burnham,	land at Cape Vincent,	500	00
	Allison & Russell,	land on Lotus Island,	4,500	00
	Joseph Northup,	labor clearing land,	199	15
	T. Dewolf,	expenses,	88	69
1899.				
Jan. 5.	J. Watterson,	Wells Island,	700	00
	A. D. Percy,	land in town of Cape Vincent,	1,400	00
Feb. 6.	C. F. Weller,	services inspecting docks,	195	00
	C. A. Taylor,	traveling expenses,	23	46
	C. C. Cook,	surveying and maps,	52	00
May 10.	C. A. Taylor,	expenses inspecting land,	62	14
June 6.	F. Dewolf,	services,	5	40
	M. B. Philips,	services,	10	50
July 6.	E. W. Visger,	constructing docks at various points as per contract,	4,800	00
" 11.	C. A. Taylor,	expenses inspecting lands and docks,	203	59
	H. W. Visger,	building water closets, etc.,	550	00
	C. F. Weller,	inspecting docks,	297	50
	Joseph Northup,	expenses clearing land,	48	00
Aug. 9.	Fay & Sons,	advertisement,	2	20
	Thousand Island Pub. Co.,	"	3	75
	Brockway Sons,	"	10	50
	Republican and Journal,	"	5	00
	Standard Publishing Co.,	"	9	50
Sept. 20.	W. H. Thompson,	wire fence,	34	30
	Jos. Northup,	fencing and clearing land,	27	00
				$14,904 91

Schedule "H."

Expenditures on Account of Forest Preserve.

1899.				
Oct. 7.	A. B. Strough,	traveling expenses,	$46	22
	William F. Fox,	"	58	54
	Elmer Ostrander,	map,	25	00
Dec. 14.	Branch & Callihan,	monument cases,	37	00
		Amount forward,	$166	76

1899.		Brought forward,	$166 76	
Mch. 8.	W. F. Lawton,	maps,	60 00	
	Wm. F. Fox,	traveling expenses,	22 61	
April 6.	Wesley Barnes,	surveying,	15 00	
June 6.	Wm. F. Fox,	traveling expenses,	70 10	
	Albany Journal,	advertisement,	33 87	
	H. D. Stevens,			
	Malone Farmer,	"	22 50	
July 13.	A. B. Strough,	traveling expenses,	52 87	
	James Senton,	services surveying,	34 66	
	Walton Stark & Co.,	materials, Jno. J. Brown house,	21 05	
	P. R. Brewster,	lumber, "	20 24	
	E. Hathway,	labor,	53 12	
	E. Hathway, Jr.,	"	41 50	
	R. Johnson,	" surveying,	15 00	
	F. Benham,	" "	18 00	
	H. Reynolds,	"	18 00	
Aug. 9.	Wm. F. Fox,	expenses traveling,	3 80	
	A. B. Strough,	"	35 50	
				$704 08

Schedule "I."

State Fair Exhibit.

1898.				
Nov. 10.	Paid W. C. DeRavenel,	packing fish tanks,	$18 55	
1899.				
Jan. 5.	Edward Joy,	plumbing,	89 67	
Sept. 15.	A. B. Strough,	traveling expenses,	64 06	
	"	paints, brushes, etc.,	2 65	
	"	1 mattress,	2 50	
	S. Emmons,	services,	10 00	
		cartage on tanks,	2 00	
	E. Fowley,	meals,	6 75	
	W. S. R. R.,	freight on tanks,	81 90	
	Quinlan & Co.,	decorations,	25 00	
	Yates Hotel,	rooms and meals attendants,	102 08	
	R. H. Bard,	cloth for stands,	11 85	
	G. W. Knox,	express co., freight,	21 42	
	H. G. Locke,	wood samples,	9 00	
	W. J. Smith,	on plumbing account,	10 79	
				$458 22

Schedule "J."

EXAMINATION OF LANDS AND TITLE THERETO IN ULSTER CO.

1898.				
Oct. 7.	Paid Chas. Davis,	legal services, - -	$300 00	
Dec. 14.	" "	" - -	75 00	
				$375 00

Schedule "K."

CAYUGA LAKE—WEIRS AND TRAPS FOR DESTRUCTION OF LAMPREYS.

1898.				
Nov. 18.	A. N. Cheney,	traveling expenses, - - - -	$30 50	
1899.				
Mch. 5.	A. N. Cheney,	expenses for constructing weirs and traps and attendants at same, - -	100 00	
				$130 50

Schedule "L."

ADDITIONAL LAND FOR HATCHERIES.

1899.				
Feb. 6.	Paid John Campbell and wife, for purchase price of land in Caledonia, Livingston county, adjoining State hatchery, - - - - - - - -		$250 00	
Feb. 6.	Paid Ella F. Dodge, for lease of land and spring for 49 years in town of Rockland, Sullivan Co., new Beaverkill Hatchery, - - - - - -		100 00	
May 6.	Paid McGuire & Wood, legal services, - -		10 00	
				$360 00

Schedule "M."

REBATES PAID TO TOWNS ON ACCOUNT OF FIRE-WARDEN CLAIMS.

Paid Town of Black Brook,	Clinton Co., - -	$145 25	
" Dannemora,	" - -	6 25	
" Andes,	Delaware Co., - -	2 50	
" Colchester,	" - -	2 50	
	Amount forward,	$156 50	

	Brought forward,		$156 50
Paid Town of	Hancock,	Delaware Co.	56 25
"	Elizabethtown,	Essex Co.,	65 50
"	Jay,	"	31 50
"	Lewis,	"	16 75
"	Moriah,	"	66 75
"	Westport,	"	10 00
"	Wilmington,	"	40 75
"	Ticonderoga,	"	57 50
"	St. Armand,	"	9 75
"	Chesterfield,	"	24 05
"	Caroga,	Fulton Co.,	4 75
"	Johnstown,	"	8 25
"	Mayfield,	"	3 12
"	Long Lake,	Hamilton Co.,	101 25
"	Wells,	"	17 50
"	Fairfield,	Herkimer Co.,	2 50
"	Russia,	"	7 40
"	Brandon,	Franklin Co.,	9 00
"	Harrietstown,	"	35 22
"	Martinsburg,	Lewis Co.,	4 00
"	Montague,	"	2 00
"	Greig,	"	31 75
"	Lyonsdale,	"	39 00
"	Croghan,	"	54 75
"	Day,	Saratoga Co.,	53 12
"	Hadley,	"	14 00
"	Wilton,	"	8 00
"	Ballston,	"	9 50
"	Corinth,	"	24 12
"	Bethel,	Sullivan Co.,	5 00
"	Forestburg,	"	11 75
"	Fremont,	"	27 07
"	Lumberland,	"	30 00
"	Fallsburgh,	"	2 50
"	Rockland,	"	14 50
"	Hardenburgh,	Ulster Co.,	17 50
"	Saugerties,	"	87 75
"	Wawarsing,	"	107 47
"	Bolton,	Warren Co.,	5 37
"	Caldwell,	"	13 50
"	Luzerne,	"	11 87
"	Stony Creek,	"	6 00
"	Thurman,	"	3 12
	Amount forward,		$1,309 83

		Brought forward,	$1,309 83	
Paid Town of Warrensburg,		Warren Co., - -	94 12	
"	Queensbury,	" - -	79 25	
"	Johnsburg,	" - -	129 77	
"	Dresden,	Washington Co., -	48 75	
"	Whitehall,	" - -	30 75	
"	Fort Ann,	" - -	79 01	
"	Remsen,	Oneida Co., - -	2 00	
"	Volney,	Oswego Co., - -	65 00	
"	Hunter,	Greene Co., - -	44 50	
"	Centerville,	Allegany Co., - -	13 37	
"	Great Valley,	Cattaraugus Co., -	51 45	
"	Pawling,	Dutchess Co., - -	18 50	
"	Royalton,	Niagara Co., - -	41 00	
"	Genesee Falls,	Wyoming Co., - -	90 75	
				$2,096 15
1899.				
Sept. 1.	To advance made to Wm. F. Fox, Supt. of State Forests, as emergency fund to cover expense of fighting forest fires in town of Indian Lake, Hamilton Co., and vicinity, - - - - - -		$980 20	
				980 20
				$3,076 35

Schedule "N."

EXTERMINATION OF BILLFISH, CHAUTAUQUA LAKE.

1898.				
Oct. 7.	To American Net & Twine Co., 1 pound net, - - -		$75 87	
1899.				
Mch. 27.	" "	1 net leader, - -	43 86	
				$119 73

Schedule "O."

CONSTRUCTION OF HATCHERY AT ONEIDA LAKE.

1898.				
Oct. 7.	Geo. F. Scriba,	labor, - - - -	$45 50	
	"	expenses, - -	3 31	
	Frank McCann,	labor, - - - -	5 25	
	James Fuld & Co.,	1 American flag, -	12 96	
	Oswego Hardware Co.,	hardware, - - -	5 84	
1899.				
April 6.	Chas. Miller & Son,	iron pipe and fittings,	177 24	
				$250 10

Schedule "P."

PROPAGATION OF GAME BIRDS.

1899.				
July 6.	Paid Wm. McGhie,	30 days' labor, $1.75, -	$52 50	
	" O. S. Johnson,	" " 1.50,	45 00	
	" The Brownell Co.,	hardware, - - -	8 00	
Aug. 9.	Wm. McGhie,	31 days' labor, $1.75,	54 25	
	O. S. Johnson,	" " 1.50, -	46 50	
	M. Bowes & Co.,	pheasant food, -	16 52	
	The Brownell Co.,	hardware, - - -	15 78	
	Abram Beekman,	lumber, - - -	28 94	
Sept. 6.	Wm. McGhie,	31 days' labor, $1.75, -	54 25	
	O. S. Johnson,	" " 1.50,	46 50	
	M. Bowes & Co.,	pheasant food, - -	12 86	
				$381 10

Schedule "R."

EXPENDITURES ON ACCOUNT OF SUIT OF PEOPLE OF THE STATE OF NEW YORK AGAINST BENTON TURNER.

1899.				
June 24.	Paid Cantwell & Cantwell,	legal services, - -	$5,477 02	
				$5,477 02

N48
1899

UNIV OF MAINE
3 7550 01031683 5